

MACWORLD

THE MACINTOSH® MAGAZINE

April 1993 \$3.95 Canada \$4.95

NEW!

Color Macs

Color Classic

New Expandable Design, Page 94

Color PowerBook

Portable Presentations, Page 120

LC III

Fast and Affordable, Page 102

Centris 610 & 650

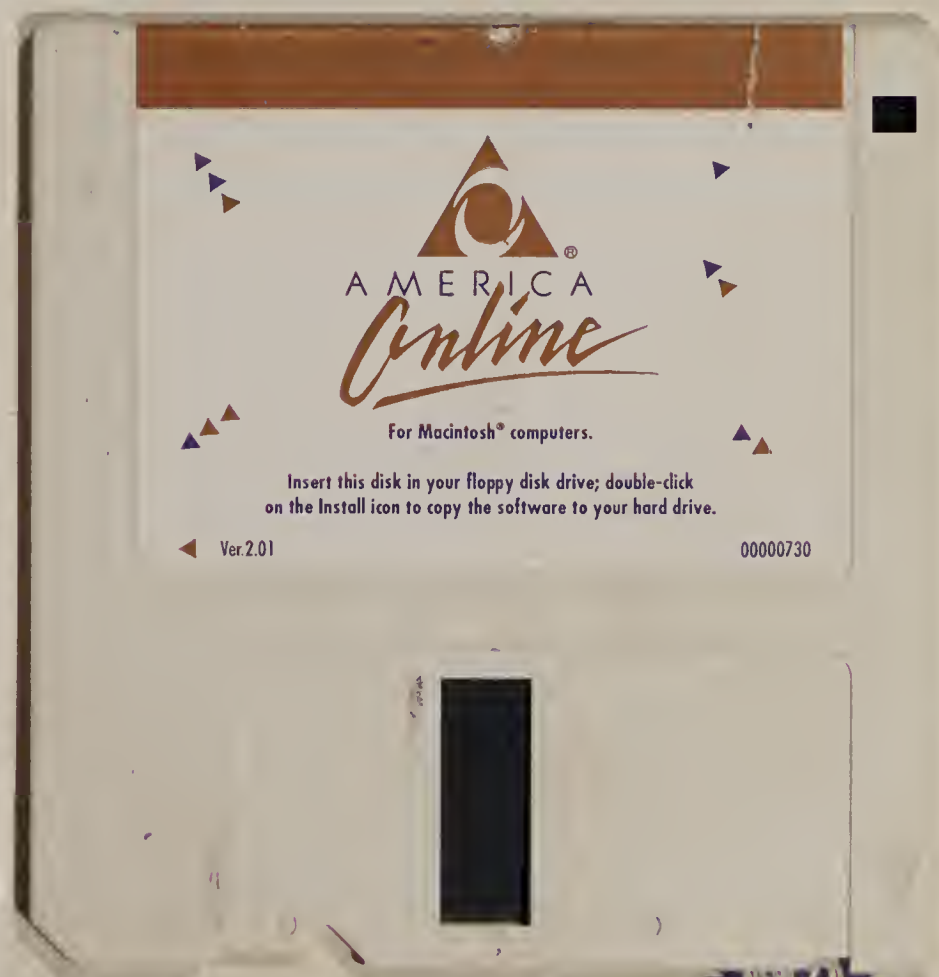
040-Based Midrange Macs, Page 110

Quadra 800

Faster than a Quadra 950, Page 118



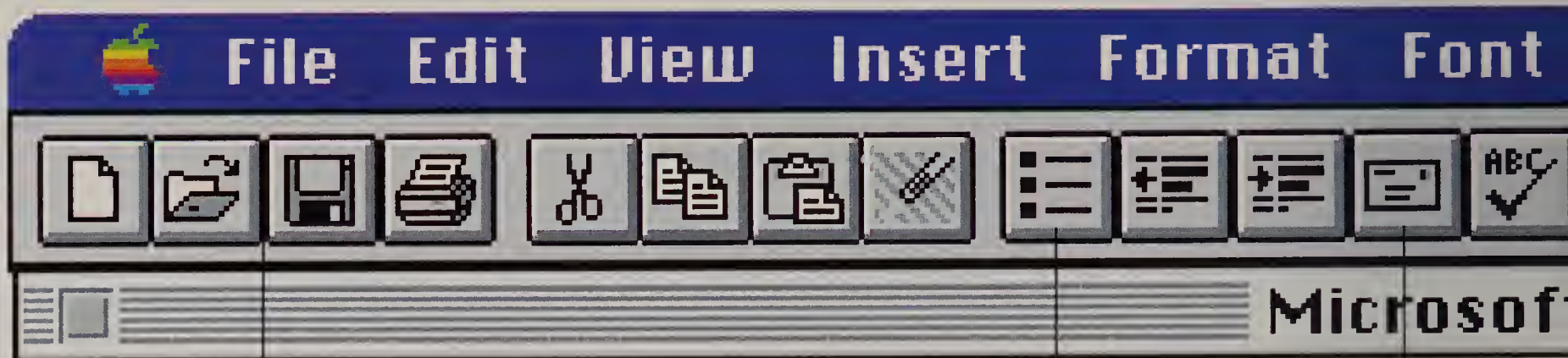
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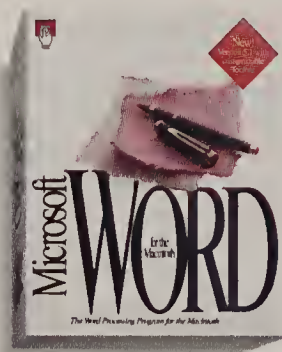


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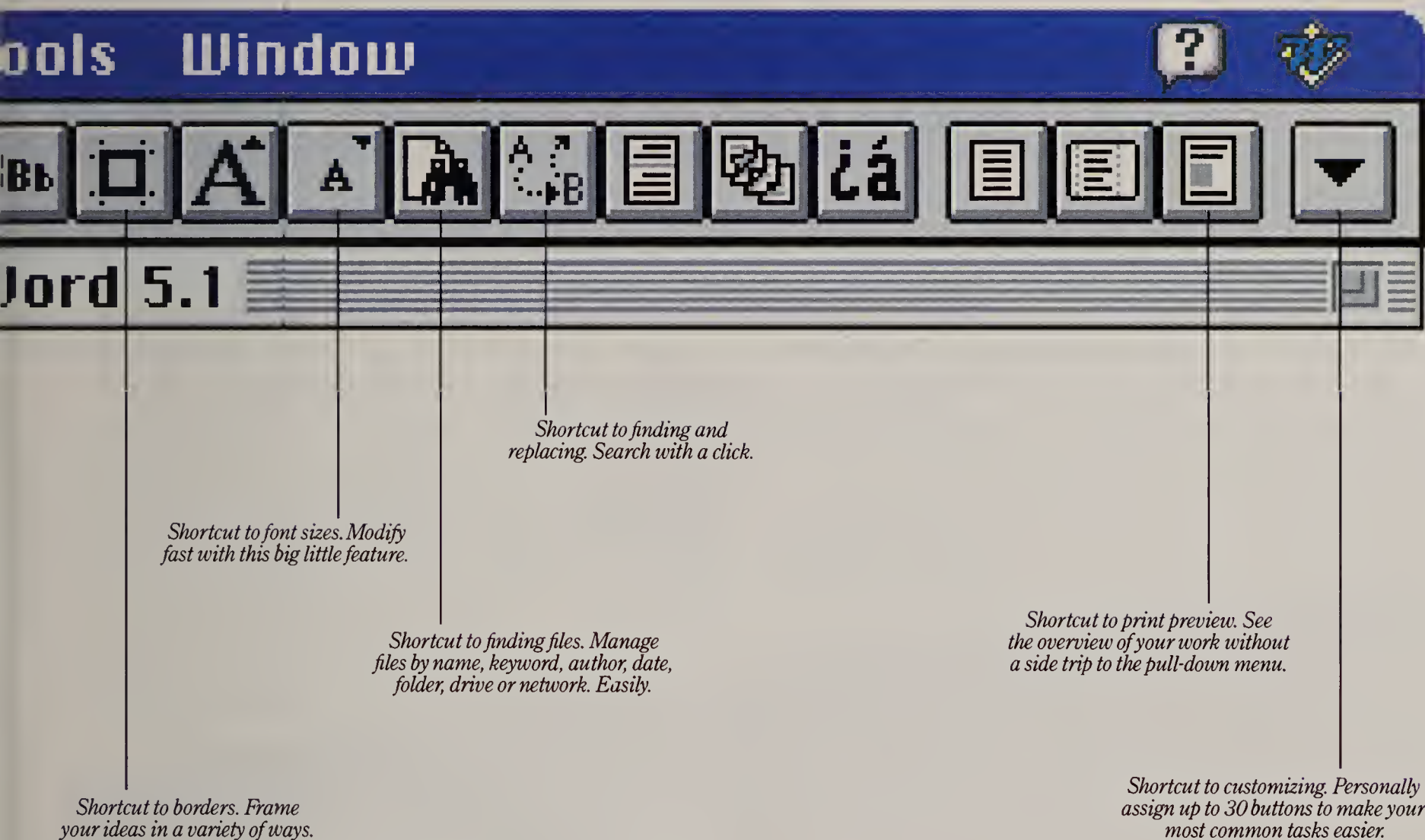
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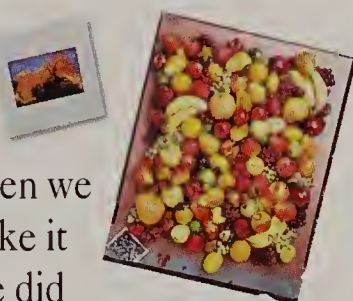
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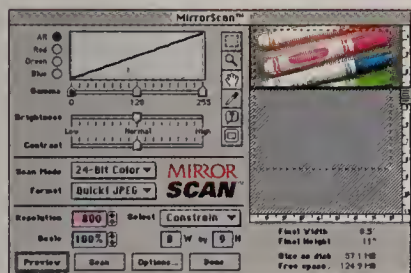
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BY JAMES A. MARTIN Apple adds color, a PDS, an FPU option, and a revamped look to the original compact Mac, but is it worth the expense?



LC III 102

BY CHERYL ENGLAND A best-bargain Mac, the LC III keeps pace with a Mac IIci and has none of the LC II's limitations.



Centris 610 and 650 106

BY GALEN GRUMAN These successors to the midrange Macintosh II series offer powerful 040-based Mac systems—at very competitive prices.



Quadra 800 114

BY GALEN GRUMAN The latest in Apple's line of high-performance Macs, the Quadra 800 outperforms the Quadra 950 but costs less.



Color PowerBook 120

BY CARY LU Burdened with a dimly lit passive matrix display, this 256-color notebook may not be the machine of your dreams.



On the Cover

THE COLOR POWERBOOK AND THE COLOR CLASSIC LEAD APPLE'S ROLLOUT OF SIX NEW MACS. IN-DEPTH COVERAGE BEGINS ON PAGE 94. (PHOTO BY MICHELE CLEMENT.)



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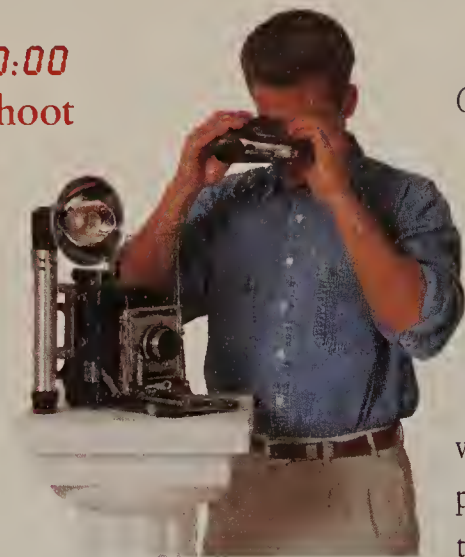
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Painless Presentations

**10:00
Shoot**



Ouch!...Film. Processing. Projectors. Trays. Bulbs.
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**10:12
Process**

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**10:45
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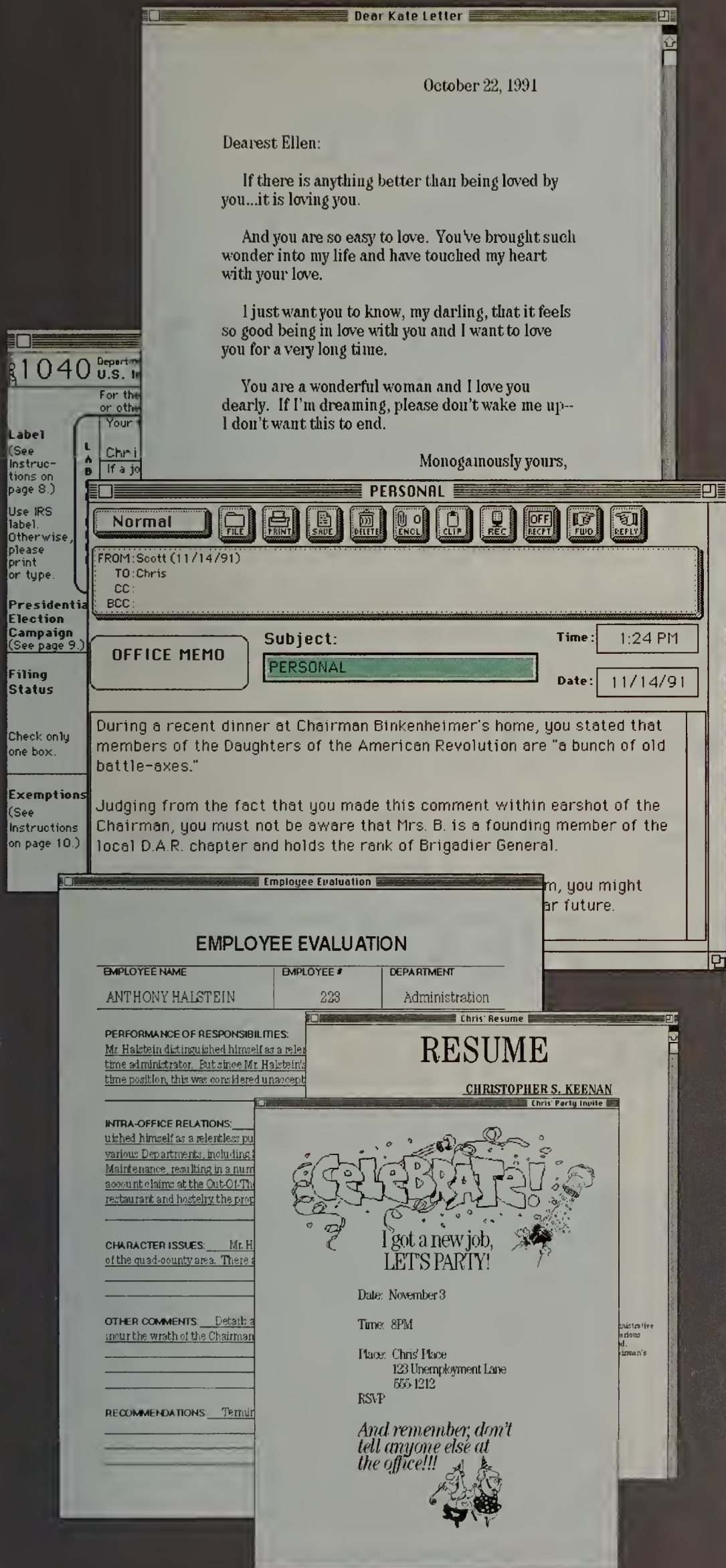
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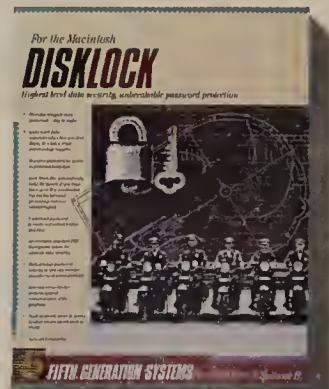
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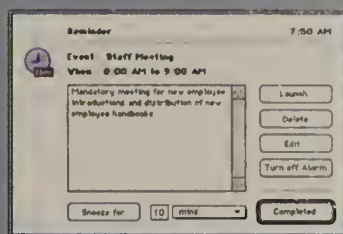


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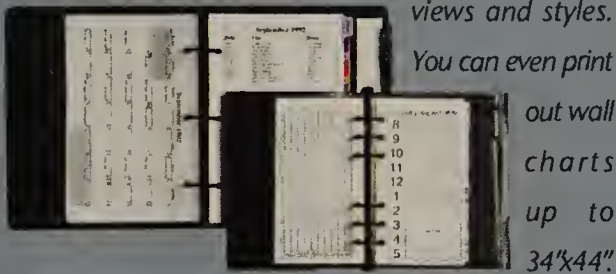
▼ The To Do list lets you schedule tasks for certain due dates or simply for whenever you get around to them. It also allows you to prioritize tasks and automatically forwards them on to the next day's To Do list until each task is completed.

Priority	Date	Title	Category
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✓ Hot	10/5/92	Send #3	Product
✓ Hot	10/12/92	Ship Direct Mail offer	Product
Hot	10/13/92	Status Report	Report
Hot		Submit Expense Report	Report
Hot		Mary Jones/Liberty Co	Call
Hot		Sam Wilson/United Corp	Call
Hot		Review Ad Copy	Business
Warm	10/6/92	OSG production	Product
Warm	10/6/92	Meet w/Kerry	Meetings
Warm	10/13/92	Meet w/Mary	Business
Warm		Bob Smith/ABC	Call
Warm		Review Sales	Business
Cold		Dill Change	Personal
Cold		Sales Report	Report
Cold		Get new Golf Clubs	Personal
	10/12/92	Paul Kent's 6-day	Personal
	10/13/92	Register to Vote	Call-Off-O
		Scheduling	Features
		To Do List	Features
		Reminders	Features
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► As well as displaying the current time in the menu bar, AlarmsClock automatically alerts you and your associates of upcoming meetings, To Do's and other events (including recurring events). Even when you're not running Now Up-to-Date.



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STEP 4. READ ALL THE DETAILS UP THERE IN THE

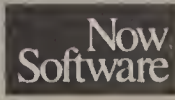
CAPTIONS THAT WE COULDN'T FIT DOWN HERE. THANKS.

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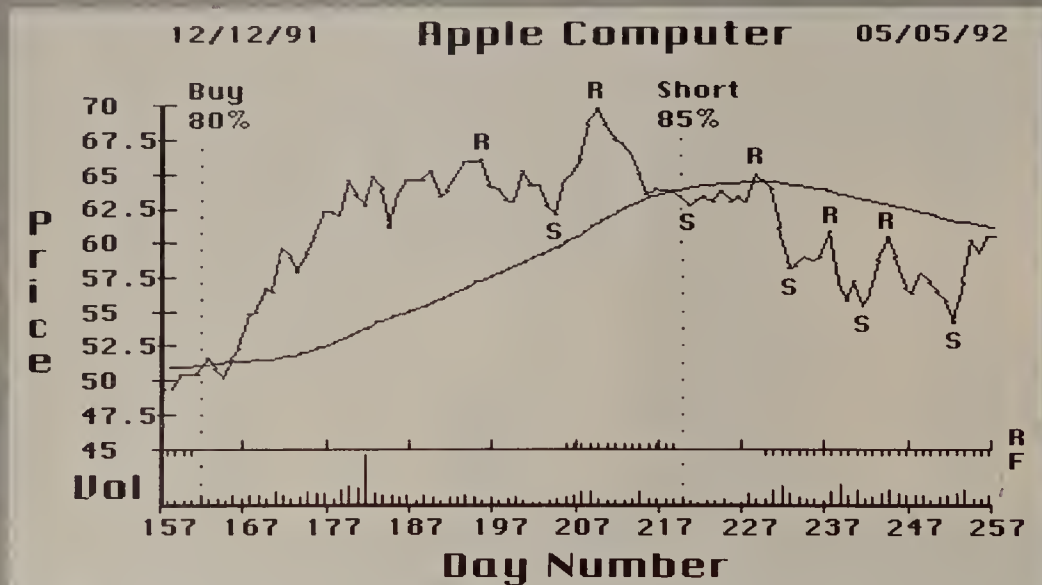
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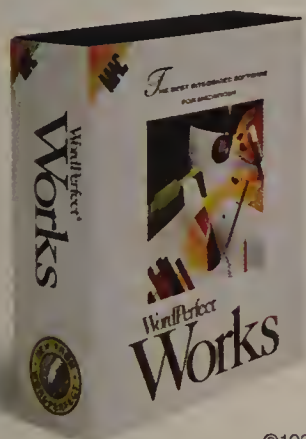
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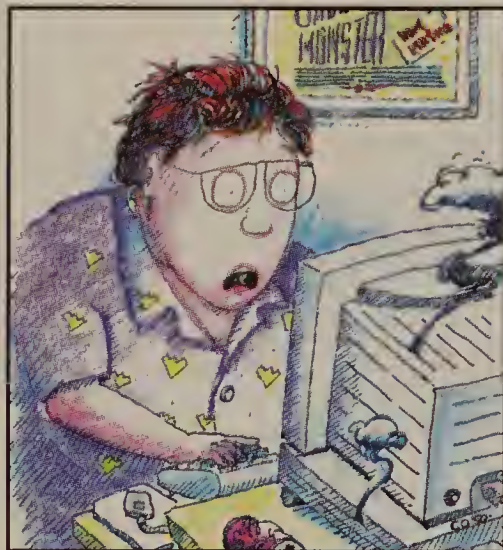


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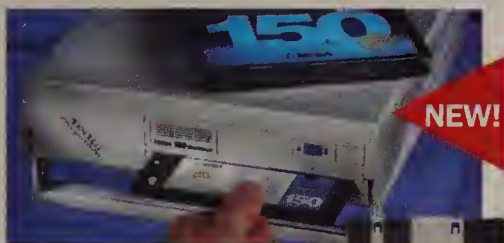
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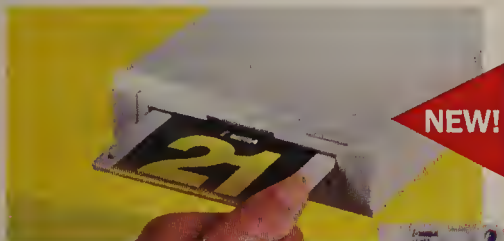
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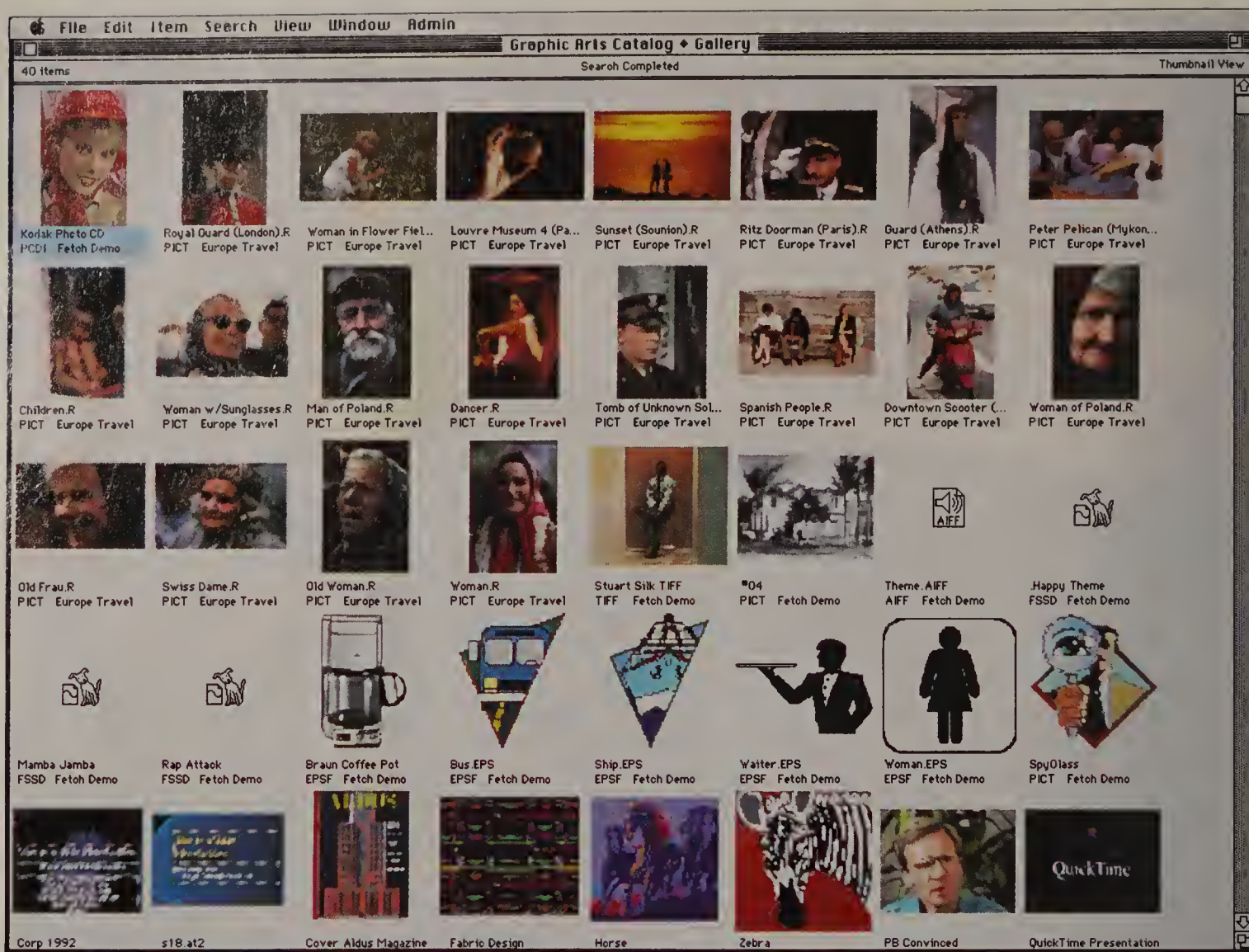
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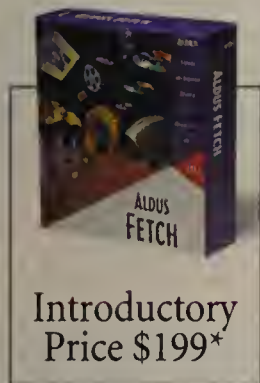
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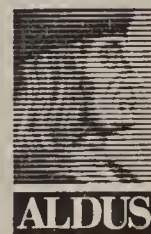
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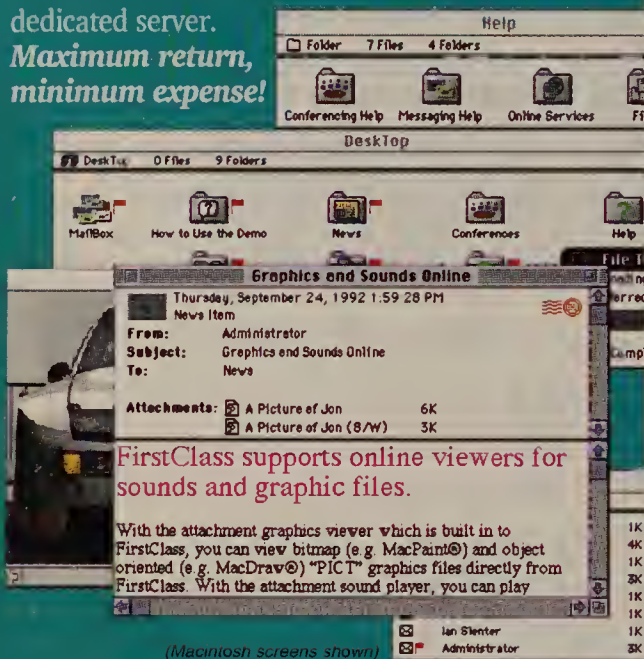
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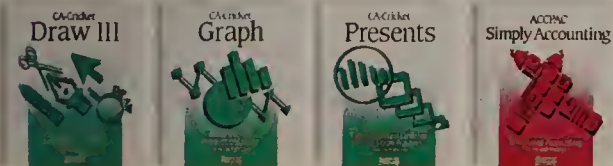
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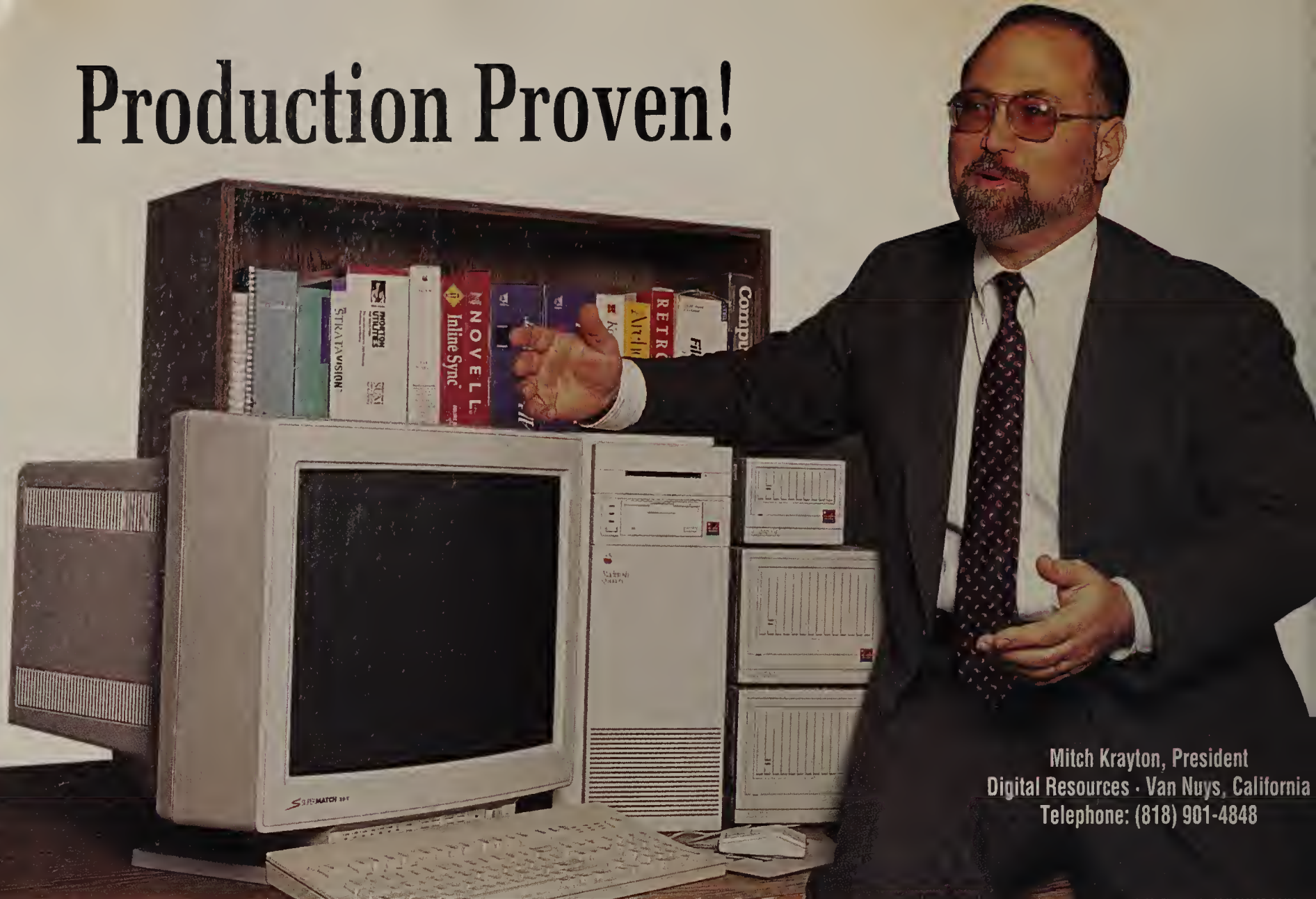


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Mitch Krayton, President
Digital Resources - Van Nuys, California
Telephone: (818) 901-4848

Real World Tests Show MicroNet's Raven-040 Disk Array Continues as the Performance Winner!

Mitch Krayton, President of Digital Resources, knows that to compete in the real world of graphics and pre-press, he has to sell the best performing, and most cost effective systems to his clients.

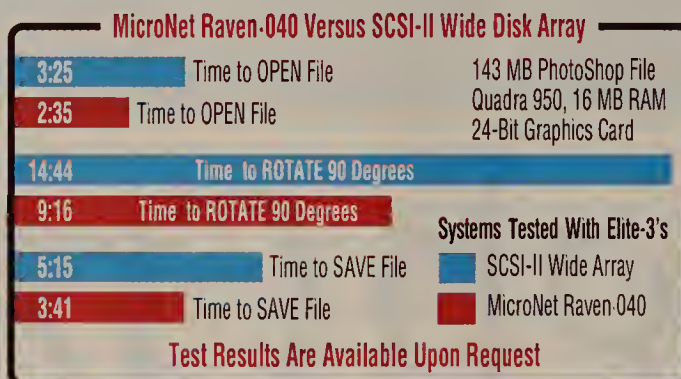
"It's easy to claim your system is the fastest, the simplest to use, or the most cost effective, but to convince my clients in this competitive field, I need to know the truth behind the claims, so I decided to run my own tests."

In head-to-head competition MicroNet's Raven-040 disk array proved its reputation as the winner of the MacUser Eddy Award for Best Storage Product of 1991.

"We found that the Raven-040 outperformed a similar capacity SCSI-II Wide Disk Array by at least one-third in real world tests. The Raven-040 was directly bootable out of the box, requiring no special INITs or mounting software.

"By using both internal SCSI ports of a Quadra 950, MicroNet's disk array left the PDS and all NuBus slots open for further expansion. The Raven-040 has been Production Proven™ for our clients for more than a year."

For pre-press and graphic solutions contact Digital Resources or call MicroNet Technology for the name of your nearest Reseller.



MicroNet Technology, Inc.

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Circle 139 on reader service card

MacBulletin

L A T E - B R E A K I N G N E W S

Newton's Alpha: Apple showed an alpha version of its Newton personal digital assistant (PDA) at the January Consumer Electronics Show. The company said it expected to begin shipping the first full-fledged model of the PDA in the middle of this year at a list price well below \$1000.

Apple's Record Revenues: In January, Apple reported that its revenues for the first fiscal quarter, ending December 25, 1992, hit an all-time high of just over \$2 billion. Net income declined, however, from \$166 million in the first quarter of 1992 to \$161.3 million as Apple continued its price-cutting, market-share strategy. Unit sales of Macintoshes were up 31 percent versus the same quarter a year ago.

RasterOps Upgrades CorrectPrint: The CorrectPrint 300i from RasterOps (408/562-4200) is an upgraded version that replaces the company's troubled CorrectPrint 300 dye-sublimation printer. The new version is up to six times faster, includes 36MB of RAM, and has a larger color range with better color matching, according to RasterOps. The company says it has begun shipping the printer at a list price of \$9999 and is offering an upgrade for the CorrectPrint 300.

Portable PostScript: Mannesmann Tally (206/251-5524) has introduced the MobileWriter PS, a portable PostScript printer that weighs 8 pounds and lists for \$999. The thermal-transfer printer produces 6 ppm at 300 dpi. It was scheduled to be available in April.

Virtual Upgraded: Connectix (415/571-5100) has upgraded Virtual, a utility that provides

virtual memory support under System 6 or System 7, to version 3.0. Connectix says that the \$99 utility runs faster and requires less disk space than Apple's virtual memory, which is only for System 7. Virtual 3.0 is for Macs with a 68030 processor; Connectix plans to release an upgrade this spring for 68040 Macs.

Pantone's Color Assistant: Pantone's (201/935-5500) new ColorUp is intended to help people who are not trained as designers to choose harmonious color palettes for presentations and other common design tasks. The \$99.95 program walks the user through creating a palette, displays sample graphics using the colors, and can export final palettes to many graphics and presentation programs. It also incorporates some interactive tutorials.

Freedom from Choosing: Portfolio Systems (408/252-0420) is shipping version 2.0 of its printing utility DynoPage. The \$89.95 package includes a timesaving new feature: users can select printers or fax devices from the menu bar of their applications or from a pop-up list in the Print dialog box without going through the Chooser.

Quick Disk Recovery: Central Point Software (503/690-2650), which makes the comprehensive data- and disk-recovery utility MacTools, is launching a utility for recovering lost disks and files that runs without requiring the user to understand what has gone wrong or to decide what to do. The \$49.95 Safe & Sound comes on a single floppy and deals with such problems as viruses, crashed disks, and lost files. [m](#)

THE FASTEST WAY TO PUT 25 GB ON A SINGLE TAPE.



The CY-8500 can store up to 25 GB on a single tape, at speeds of up to 90 MB per minute, completely unattended.

How? With hardware data compression that can boost capacity by up to five times.

No other 8mm tape drive can match the capacity, speed, and price-performance of this best-selling drive.

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DEC Q-Bus	Prime
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Speak Your Mind

HOW SATISFIED ARE YOU WITH THE
MACINTOSH PRODUCTS YOU USE?

ANNOUNCING THE 7TH ANNUAL MACWORLD
WORLD-CLASS AWARDS SURVEY

Every year Macworld conducts the World-Class Awards survey to give our readers a chance to voice their opinions of the Macintosh hardware, software, and computer peripherals they use. This year we're asking you to write in the names of as many as ten products and rate your level of satisfaction with them.

Please use this form to provide the following information for each product. First write in the full names of the product and company. Then circle a number from 1 to 10 that represents your level of satisfaction, with 10 being the highest

possible rating and 1 being the lowest. In making your evaluation, consider all of the following factors, as appropriate:

- features
- design
- innovativeness
- adherence to the Macintosh interface
- ease of use
- customer service
- technical support

We're also asking you to name the most promising and innovative hardware and software newcomers to the Macintosh market (to qualify, products must have

been released since January 1992), and tell us which companies provide the best customer support.

Tell us what you think. Send your form (postmarked no later than March 19, 1993) to: World-Class Awards Survey, Macworld, 501 Second Street, San Francisco, CA 94107.

Thank you for your opinions. Results of the 7th Annual Macworld World-Class Awards survey will be announced at the Boston Macworld Expo in August and published in September's issue.

7th Annual Macworld World-Class Awards Survey

1 = NOT AT ALL SATISFIED - - - 10 = EXTREMELY SATISFIED

COMPANY NAME

PRODUCT NAME

1 2 3 4 5 6 7 8 9 10

COMPANY NAME

PRODUCT NAME

1 2 3 4 5 6 7 8 9 10

COMPANY NAME

PRODUCT NAME

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1 2 3 4 5 6 7 8 9 10

**MOST PROMISING
NEWCOMER—HARDWARE**

COMPANY NAME

PRODUCT NAME

**MOST PROMISING
NEWCOMER—SOFTWARE**

COMPANY NAME

PRODUCT NAME

**BEST CUSTOMER
SUPPORT—HARDWARE**

COMPANY NAME

**BEST CUSTOMER
SUPPORT—SOFTWARE**

COMPANY NAME

MACWORLD

World-Class Changes

BY ADRIAN MELLO

EVERY YEAR FOR THE PAST SIX years *Macworld* has asked its readers to vote for their favorite Macintosh products. And every summer, after you indicate your choices for best products, *Macworld* reveals the winners and presents them with the World-Class Award. The editors have always been proud that the World-Class Awards were based on readers' opinions instead of editors' opinions. After all, we get to tell you what we think about Macintosh products in the hundreds of product comparisons and reviews we print throughout the year; it's only right that the people who use these products every day should have a say.

This marks the awards' seventh year, and once again, we are asking you to choose the Mac products that you think best represent excellence. But this year we have changed the basis on which we confer the awards. Instead of asking you to choose the best product within a specific category from a list, we want you to name the products that have given you the greatest satisfaction. We're asking you to register how satisfied you are with the products you use.

Why the change? Two reasons. One is that it has become unrealistic to expect users to choose among literally thousands of products. How many readers have the time to try out ten word processing programs before deciding which is best? Even comparatively narrow product categories such as project management and mathematics software have swollen with new offerings in recent years. But there's another reason for the change—to reward those companies that go beyond innovation by providing solid products with good support at reasonable prices.

Reader Satisfaction

A COUPLE OF MONTHS AGO I described the criteria we use to rate products that we review in *Macworld*. I would like you to consider these same criteria when you decide how satisfied you are with the products that you use. When judging your own degree of satisfaction, ask the following questions: Did the product's interface live up to the standard of quality established by the Mac's own interface? Was

the program easy to learn and use? Were the features and design of the product appropriate, complete, and well-executed? Was the documentation thorough and well-organized? If you have required after-sales support, has the company been responsive? Was the product priced reasonably for the job it does? Did it perform quickly and responsively? Was it reliable, or was it incompatible or buggy? Finally, was the product innovative and/or original? Please keep in mind that you cannot expect a product to be something it was not designed to be. For example, don't judge your word processor too harshly because it can't lay out pages as effectively as a desktop publishing program.

After you have considered the relative merits of each product you use, choose a number from 1 to 10 to show your overall satisfaction with the product. The best satisfaction rating you can give is a ten. After we hear from you and other readers, we should have a better idea of how satisfied a product's buyers feel after they have used it. The products with the highest user-satisfaction score in their category will be the World-Class winners. This is the most important measure of all, because even the most in-depth analyses by editors can't compare to the real-world experience of thousands of readers. We'll share the results and announce the winning products in the September issue of *Macworld*.

Apple Is Back

ANOTHER CHANGE TO THE AWARDS is that Apple products will be eligible again. Last year *Macworld* eliminated Apple from the contest, leading to confusion for some readers. Since that time companies have run advertisements proudly announcing that their products won World-Class Awards. These companies have a right to be proud of their achievements. Unfortunately, since Apple did not win any World-Class awards, some readers mistakenly inferred that Apple products had lost. The actual case was that Apple products were ineligible to begin with.

To avoid similar confusion

this year, we are including Apple products in the competition. This means you can indicate how satisfied you are with any Apple product you use, whether it is a printer or a scanner or any Macintosh model.

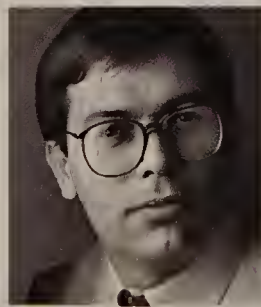
Now that there are so many different Macs, it will be interesting to see how satisfied everyone is with their model. Use the same criteria with Apple products as with products from other companies. Note that on the ballot card inserted in this issue, we have room for only ten products—even though you may use more. Please write in the names of your choices from among the products that you use the most and are most familiar with.

Special Categories

IN ADDITION TO THE NEW CUSTOMER-satisfaction awards, we are continuing to ask you to vote in several special categories. Since innovation has always been key to the Mac, we want to encourage creativity by recognizing new products that capture the imagination of our readers. You can nominate one software product as the most promising newcomer introduced since the beginning of 1992. You can also pick the most promising newcomer out of the hardware products introduced in the same period.

We also want to recognize outstanding companies that provide the highest quality of support for the products they sell. As part of our reviewing process, we check on the support that companies provide. We also regularly report on support issues in the *Conspicuous Consumer* column, calling special attention to exemplary cases of support in the column's "Service Heroes" section. Now we would like to hear your choices for best support. If you have experienced outstanding technical support or any other after-sales help, you can vote for best customer support for both hardware and software.


The readers have always been the heart of the World-Class Awards. This year we are working even harder to get your opinions—not just on which products you like, but also on how satisfied you are with them. **m**



Which
Mac products
most
satisfy you?



GOLIATH.



DAVID.

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Letters

APRIL 1993

Tough Competitors

I CANNOT QUITE CONVINCE MYSELF that my next computer should be a Macintosh. In the December 1992 issue you compare a TravelMate 4000 notebook to the new PowerBooks ("New PowerBooks: The 145, 160, and 180"). It is very disheartening to see how poorly the "newer, faster" Apple products performed in testing. The inconvenience of learning enough DOS to load some programs and install Windows is negligible when it means saving hundreds of dollars buying a 486DX system rather than a Quadra, IICI, or IIVx.

Robert Hinkle
Salt Lake City, Utah

TO MY SURPRISE YOU INCLUDED my all-but-ignored Outbound 2030S in the list of comparisons. Lo and behold, it is still faster than even the best new Macs and would have been at the top of the list except for some DOS machines.

Despite its superior performance, you virtually dismissed the Outbound because it isn't an Apple Macintosh. If fear that the company might go out of business is the only criterion for not covering the Outbound, you should endorse only Apple, Claris, and Microsoft and relegate virtually every other hardware and software venture to the "these guys might not be around in the future" category.

Daniel Koblosch
Redondo Beach, California

Outbound has closed its doors. See *MacBulletin*, March 1993.—Ed.

AFTER SEEING YOUR RECENT issues, I dropped four grand on a PowerBook 180, saw several annoying white dots in the screen, and returned it the next day. The dealer wouldn't exchange the machine because bad pixels are an epidemic among PowerBooks, and he didn't want to pillage his stock until we found one I could accept. I later discov-

ered that Apple considers a screen with fewer than five pixel voids to be the customer's problem.

I can't believe that for a computer on which the screen is the singular focus of the user's attention, this kind of defect could be excused by a manufacturer's arbitrary standard of what constitutes defective merchandise.

Matt Resnicoff
New York, New York

For more on Apple's policy regarding PowerBook pixel voids, see *Conspicuous Consumer*, July 1992.—Ed.

Upgrading Tips

DEBORAH BRANSCUM'S "THE Upgrade Express" brought to mind a question I have concerning what to do with all the older versions (*Conspicuous Consumer*, December 1992).

I never throw away older versions of software because no one can truly guarantee upward compatibility. There is nothing worse than opening (if you can) a document created by a previous version and finding that nothing looks the way it used to.

Irvin Bingham
Frederick, Maryland

Readers should watch out for incompatibilities between older application versions and new Apple system software versions.—Ed.

MY IDEA FOR UPGRADING IS SIMPLE. Included with the software or on the registration form, the consumer should be offered any one future upgrade for a one-time additional cost. When each upgrade is ready to come out, the company could offer the upgrade to each of its customers and give them the choice to get it or wait for the next.

JoAnn Roa
New York, New York

continues

After Dark

THE ULTIMATE SCREEN SAVER
32 incredible displays to prevent phosphor burn-in. Flying Toasters and fantastic Fish. Screen-locking password protection. Company logo and message display. SystemIQ activity monitor.



More After Dark

An all-new collection of 26 add-on displays. Contest winners Mowin' Man, Tunnel and GraphStat. Virex®-D virus scanning module from the makers of Virex. Boris the Cat. Lunatic Fringe space game from the creator of Solarian II. Beautiful new fish.



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Epson now makes the
Suddenly everything you see in your



anner for Macintosh.
ffice you can see in your computer.



Drive Recovered; Reader Eternally Grateful

THAT ARTICLE BY ROBERT C. Eckhardt absolutely saved my life, or at least my day ("Hard Drive Rx," December 1992). I just finished reading it last week and thought that, although very interesting, it was unlikely I'd ever need it. Since using Apple computers since 1982, I had never seen the flashing "?" upon

start-up—until tonight. I turned to page 212 in your December issue and within 15 minutes I was up and running again. To my grave I will subscribe to *Macworld*.

Joseph Pankowski
Tallahassee, Florida

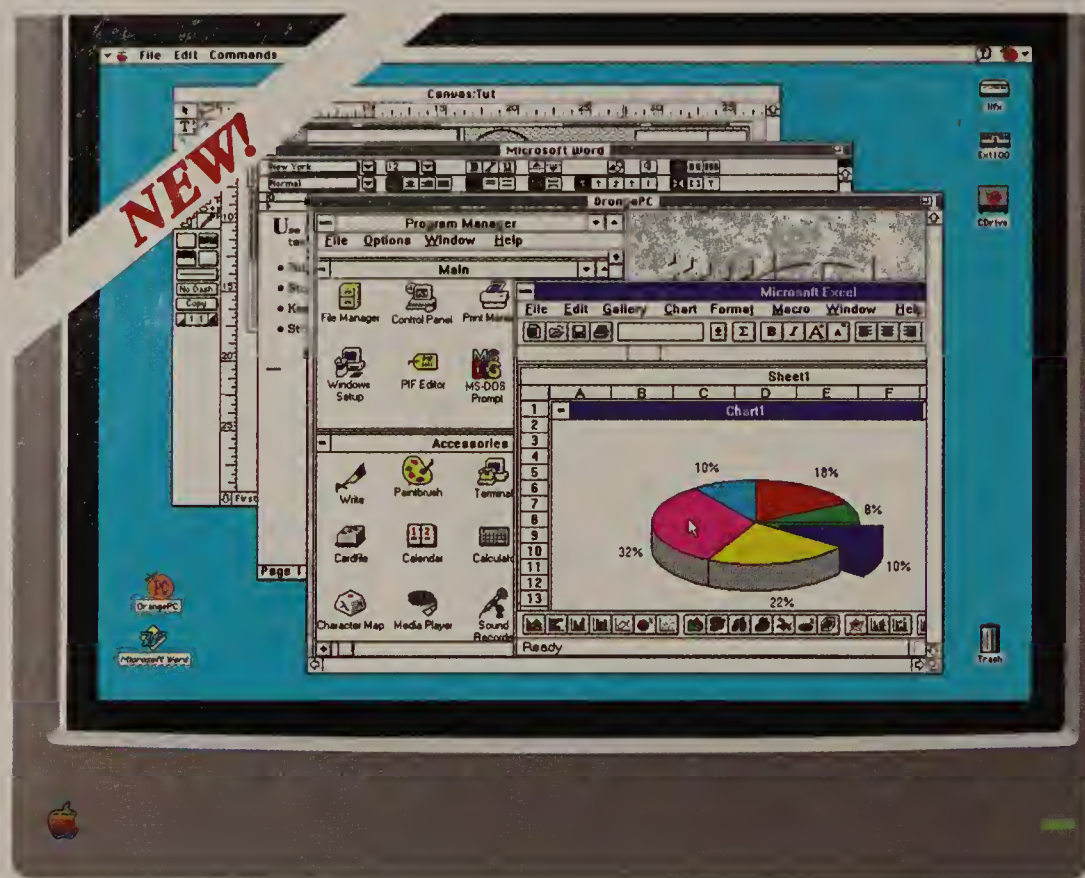
Harmless Piracy

STEVEN LEVY SAYS "SOFTWARE DEVELOPERS ARE DEFINITELY HURT BY PIRACY"

(*The Iconoclast*, January 1993). Not! Calculation of "lost income" based on assumptions of what people might possibly buy is speculation at its most fanciful.

The piracy problem is the inevitable result of trying to apply ownership to an intangible thing. I paid for my software. But I didn't just get the books and disks. Instead of spending all my time to make my computer do my bidding, I paid for someone else to do that, and for technical support when I encounter a problem. Software development is a service, not a product.

Ken Beck
Spokane, Washington



DOS[®], Windows[™] 3.1 and 486 Performance

Orange[®] PC
MS-DOS Coprocessor

Run Mac[®] and PC programs simultaneously
VGA graphics on a Mac monitor
16 times faster than SoftAT[™]*

The OrangePC nubus card is truly a technological breakthrough for running MS-DOS applications on the Macintosh. Combining the dramatic 486 performance and full VGA graphics in a window on a Mac monitor, it represents a state-of-the-art hardware solution. Unlike lazy DOS software emulators, OrangePC packs the power and features to get the job done for serious corporate users at a price which eliminates the DOS clone alternative (starts at \$1099). OrangePC features: shared Mac/DOS files; runs DOS 5.0 and Windows 3.1 (enhanced and protected mode); one AT bus slot for compatible PC network connection; up to 16 MB on-board memory; PC parallel and serial port. So if you need 486 performance and Windows 3.1 on a single Mac based platform, call us for your own OrangePC.



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* Call for benchmark details.
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Circle 33 on reader service card

SMALL NEW COMPANIES WITH INNOVATIVE products, like mine, cannot survive with high piracy rates. The programmers and publishers who worked hard to produce the product and bring it to market get not a penny if you pirate our software. If the software isn't bought, our company folds and all our work goes down the drain. The software that you continues

CORRECTIONS

The suggested retail price for the PowerBook 180 is between \$4109 and \$4469 ("New PowerBooks: The 145, 160, and 180," December 1992).

The actual resolution of the Hewlett-Packard LaserJet 4M is 600 by 600 dpi ("Workgroup Printers," January 1993).

The modem-port and printer-port labels were reversed in the "What Makes a Logic Board" illustration on page 142 ("Your Computer Revealed: Inside the System," November 1992).

The correct name of Toshiba America's 17-ppm laser printer is PageLaser GX400 ("Workgroup Printers," January 1993).

The weight of Proxima Corporation's ColorWorks sx A502C and Ovation sx A812C LCD panels is 7 pounds ("Crystal-Clear Presentations," January 1993).

Add Noise, a computer art show held in July 1992 in San Francisco, was organized by Bay Area artists Diane Fenster and Sigi Torinus, and by Matthew Boryslawski, principal of View by View, an architectural visualization firm (Art Beat, January 1993). The show was sponsored by Eastman Kodak and View by View, and the opening reception was hosted by Adobe Systems.



High resolution color scanners. New from Epson.

Epson® introduces eyes for your Macintosh®—complete with everything you need to start scanning immediately. Both the 600C and 800C models feature 24 bit, one-pass and three-pass scanning. Both come bundled with full versions of Adobe® Photoshop™, so you can manipulate all the images you capture.

You get Caere® OmniPage® Direct OCR TryPack, so you don't have to retype documents. You get a PIM, cable, and all you need to make your scanner a desk accessory.

We offer an add-on transparency unit, which gives you the flexibility to scan slides. A document feeder attachment for both

models. And of course it's all protected by Epson's one-year warranty.

Drop by your computer store soon and take a look or call 1-800-289-3776 and ask for representative 75 for more information. Just don't be surprised if you end up with a scanner.

EPSON®



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Scanners



Dot Matrix



Lasers



Notebooks

liked well enough to steal then isn't supported or maintained or upgraded.

*Linda Kaplan
President
Thought I Could
New York, New York*

DUE TO THE RICH CONTRIBUTION software firms make to the ad line, one should not expect too many piracy stories in *Macworld*. Too bad, because the free exchange of software is the engine that drives growth in this industry.

The world would be a very different place without unauthorized software duplication. The whole computer industry would be far smaller. Laser printers would start at \$5000, and only the well-to-do would have computers in their homes.

If you print this letter, please withhold my name and address. I don't wish to be harassed by the SPA.

*Name Withheld by Request
Berkeley, California*

Re: Saints and Sinners

I BOUGHT BEAGLEWORKS IN THE spring of 1992, shortly after getting my computer. I was disappointed to find it

extremely slow and buggy, so much so that I found it unusable. I called Beagle Bros and was told that they would send me an upgrade when it was complete. Although the quick and courteous response pleased me, I never received an upgrade.

Is there in fact a more recent version, and if so, how do I contact WordPerfect for an upgrade? BeagleWorks had a lot of potential, but at the moment it is merely an expensive piece of shelfware.

*Jonathan Stimmel
Brattleboro, Vermont*

After acquiring BeagleWorks, WordPerfect upgraded and renamed the program WordPerfect Works for Macintosh version 1.2. BeagleWorks owners who bought the product after October 16, 1992, will receive a free, disks-only upgrade. BeagleWorks owners who bought the product before October 16 can get a disks-only upgrade for \$8 within in the United States. The new reference manual is \$29.95, and the new workbook is \$19.95. Readers can contact WordPerfect by phone at 800/451-5151 or by fax at 801/228-5377 for more information.—Ed.

THE LORAN INTERFACE ON OUR MicroPhone II and MicroPhone Pro communications software does help users navigate CompuServe, but it was not meant to compete directly with or replace

a product like the CompuServe Information Manager.

Loran gives users one online interface. You don't have to log on and off separate services to collect your mail, using different and often arcane comments and functions each time. Instead, you know one interface, connected to back-end modules that know how to do the dirty work of navigating various services.

*Paul P. Schmidman
Vice President, Sales and Marketing
Software Ventures Corporation
Berkeley, California*

Seconds Critique

I HAVE TO AGREE WITH YOUR CRITICISMS of the Quick Link II Fax software bundled with the Viva modem (*Reviews*, January 1993). I had it. It is frustrating. In my experience, sending faxes takes around ten minutes if it works. Sometimes it gave me error messages when the fax had been transmitted successfully. Once I received a call telling me to stop sending faxes. I had been resending after each error message and the recipients were drowning in paper from their fax machine.

continues

PHOTOREALISM



Artist: Dale Heriestad Producer: Harry Marks



Artist: Jon Watson; image modeled and rendered entirely in StrataVision 3d.

StrataVision 3d is realistically the best 3D program on the Mac. ● Already donned with top industry awards, there's even greater power with version 2.6. New modeling features give you more control over objects. Apply realistic textures, set reflectivity and soften shadows with improved ease. Animations of flexible objects offer stunning results. StrataVision 3d 2.6 still has a realistic price; \$995. ● Whether you're an illustrator, a designer or an architect, we have the realistic solution. Call toll-free 1-800-869-6855 today.



STRATA

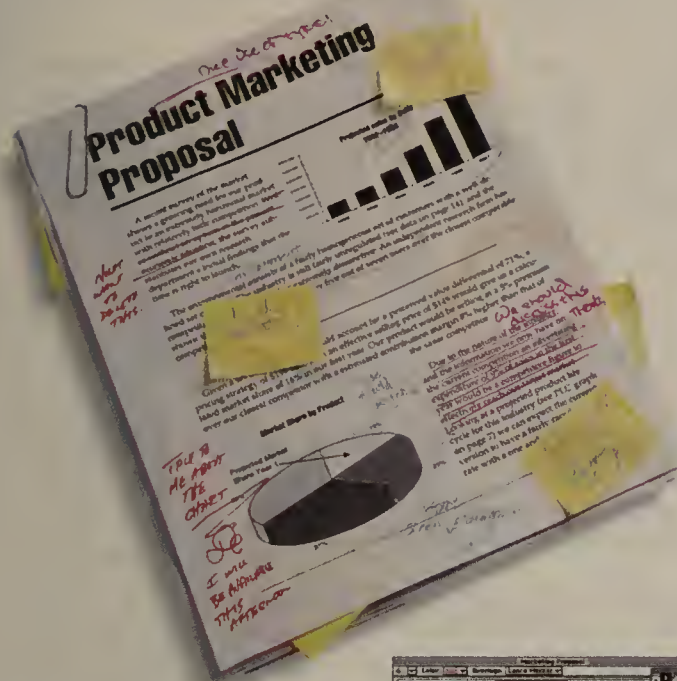
The Virtual Studio™ Company.

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*StrataVision 3d created the ABC image for animation storyboards. StrataVision and StrataVision 3d are trademarks of Strata, Inc.

Circle 293 on reader service card

Perfect It.

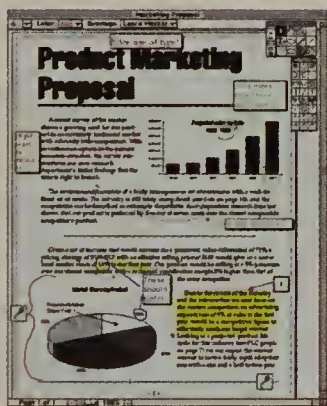


Protect It, Organize It, Retrieve It, Share It, Leverage It...

MarkUp 2.0 Document Editing and Review

You've put a lot of work into that document. Now you just need to show it to a few people, get their comments, and it will be golden. Unfortunately, this usually means passing out copies to each reviewer in a group, then waiting to get the copies back, only to end up with a stack of papers covered with scribbled marks and little stick-on notes. So much for feedback.

With MarkUp, this process is Mac-based, making it automatically easier. Instead of passing out paper, a review version of any document is sent—through e-mail, over a network, or even on a disk—to each person in your group or just to the guy down the hall. The review version is an electronic copy, created by MarkUp, that looks exactly the same as the original would look on paper.



Instead of marks on paper, MarkUp offers two full palettes of tools and proofreader's marks. There's a highlighter tool, a strikeout tool, note windows to replace those stick-on tags, even a voice-annotation tool and QuickTime support to convey a message as only sound or pictures can.

Instead of collating multiple paper-based versions, MarkUp shows each reviewer's edits on a named overlay. These can be viewed individually or merged together into a single review document—with each set of revisions still identifiable.

Now you won't have to wade through the paper flood again. Review a single MarkUp file, choose the edits you want to implement, then just do them.

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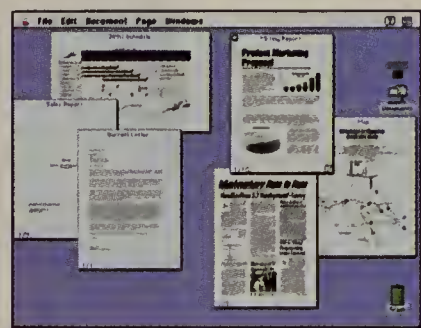
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Search any or all document centers to which you have access. A search query can be driven by any combination of keywords, document content, archival date, or document owner.

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MarcoPolo lets individuals and workgroups leverage the wealth of today's world: information. Buy MarcoPolo today and you can get what you need, when you need it.



Mainstay

The finest point about this software is the technical support. It's a BBS (bulletin board system)! Fine if the software works, but then you wouldn't need help.

Donald Mackie
via CompuServe

The High Cost of Low Cost

EVEN THOUGH THE FOCUS OF JIM Heid's article was to promote the ac-

quisition of free/shareware, he suggests three telecommunications programs that are not freeware or even shareware (*Getting Started*, December 1992). He fails to mention the \$30 shareware telecommunications program called ZTerm, which supports scripting and macros and, contrary to Heid's assertions about the uniqueness of Smartcom II, also supports the CompuServe B Plus protocol.

Second, the explanation of the file-transfer protocol was confusing even to

the initiated modem user, and the suggestion that Xmodem should be used by beginners was very misguided. ZTerm requires very little effort to be used successfully. Once the Zmodem protocol option is selected on both the user's software and the host's computer, receiving a file is as simple as telling the host computer to download.

Finally, Heid's emphasis on CompuServe and America Online as places to find free/shareware is again contradictory to the theme of the article—acquiring low-cost, but quality, software. Small-scale bulletin boards are free, and the system operator, also known as the sysop, can usually provide more assistance to the new user on the hows and whats of downloading software. Your local computer store will usually be able to refer you to local phone numbers of bulletin board systems.

David Hamermaster
Moscow, Idaho

For more information on bulletin board systems, see *Conspicuous Consumer*, March 1993 and in this issue.—Ed.

A Company Responds

ACCORDING TO THE NOVEMBER 1992 *Reviews*, "NightWatch is not currently compatible with After Dark and will freeze your After Dark screen." This statement does not give the whole story. Any two screen savers operating on one computer at the same time will have similar problems; therefore, only one screen saver should be used at any one time.

In order to use After Dark as your screen saver and NightWatch as protection for your hard drive, turn off the screen saver feature in NightWatch.

Raman Boucher
Macintosh Technical Support
Berkeley Systems
Berkeley, California

Letters on Letters

I WAS AMAZED THAT SOMEONE would write to chastise you on Deborah Branscum's *Conspicuous Consumer* columns on Ehman and Bridgette (*Letters*, January 1993). She has done the Mac community a service and should be given a commendation for her reporting.

Richard Manhard
Springfield, Virginia

DUGLAS ETHRIDGE COMPLAINS about the technical side of the reviews that you publish, and specifically continues



IT'S THE BEST PIZZA JOINT IN TOKYO.

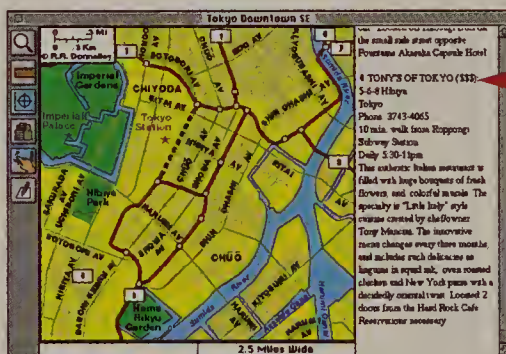
(But how would you know that?)

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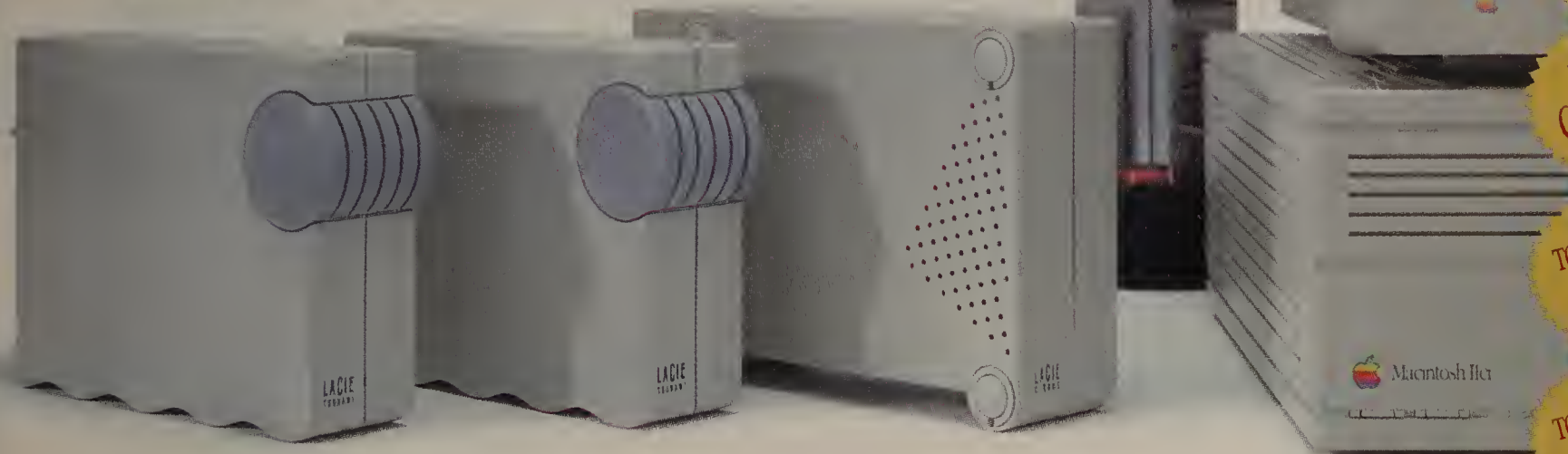
- ☒ **Disk-for-disk or better replacement.** If you have a problem with your La Cie drive while under warranty, we'll ship you a replacement within 48 hours. We've also been known to replace disks with better ones, rather than make a customer wait. That's how important your drive is to you. That's how important you are to us.
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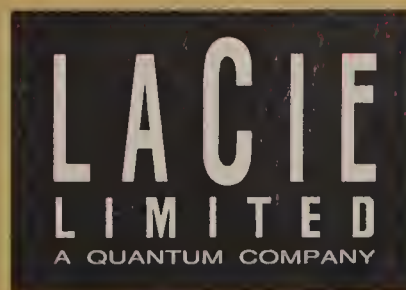
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points out the October 1992 slide scanner review (*Letters*, January 1993). Frankly, he's whining because you're not publishing information he has a direct use for, and that's just dumb.

By the way, *Macworld* should set up a fax line for *Letters*, *QuickTips*, and so on. Several times in the past I'd contemplated mailing a letter to *Macworld*, but I'd been put off by the U.S. Mail.

Steve Godun
Piscataway, New Jersey

Readers can fax letters and tips to *Macworld* at our main fax number, 415/442-0766.—Ed.

Unfair Comparisons?

IN "LOOKING DOWN THE LINE" YOU present an unfair comparison of the IIVx to the IICI (December 1992). You state the RAM capacity of the IIVx based on 16MB SIMMs, yielding a total capacity of 68MB. You then state the capacity of the IICI based on 4MB SIMMs, yielding only 32MB. To my knowledge, the IICI can accept 16MB SIMMs for a total RAM capacity of 128MB. The IIVx is a great machine, but I get the feeling you're trying to sell us on this improved LC II at the expense of the IICI.

Cedric Johnson
Scottsdale, Arizona

According to Apple specifications for the IICI, it can only accept up to 4MB SIMMs, quite possibly because at the time the IICI was being developed, 16MB SIMMs were not available.—Ed.

THE POWERBOOK 180 MAY HAVE the best combination of screen and power from a computer geek's mind-set, but that does not mirror the mind-set of the businessman. As a traveling businessman, my major concern is weight. Once you travel with computer, luggage, coat, and everything else, every excess pound is a burden.

As one of the first purchasers of the Duo, I can say that if Apple was targeting businessmen, they did it.

David Dimston
Laredo, Texas

Letters should be sent to *Letters*, *Macworld*, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld1). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*. **m**

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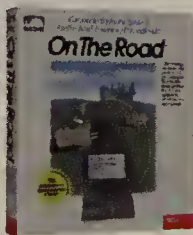


printer you used. And *On The Road's* sophisticated location recognition gives all PowerBook users automatic site-specific configuration.

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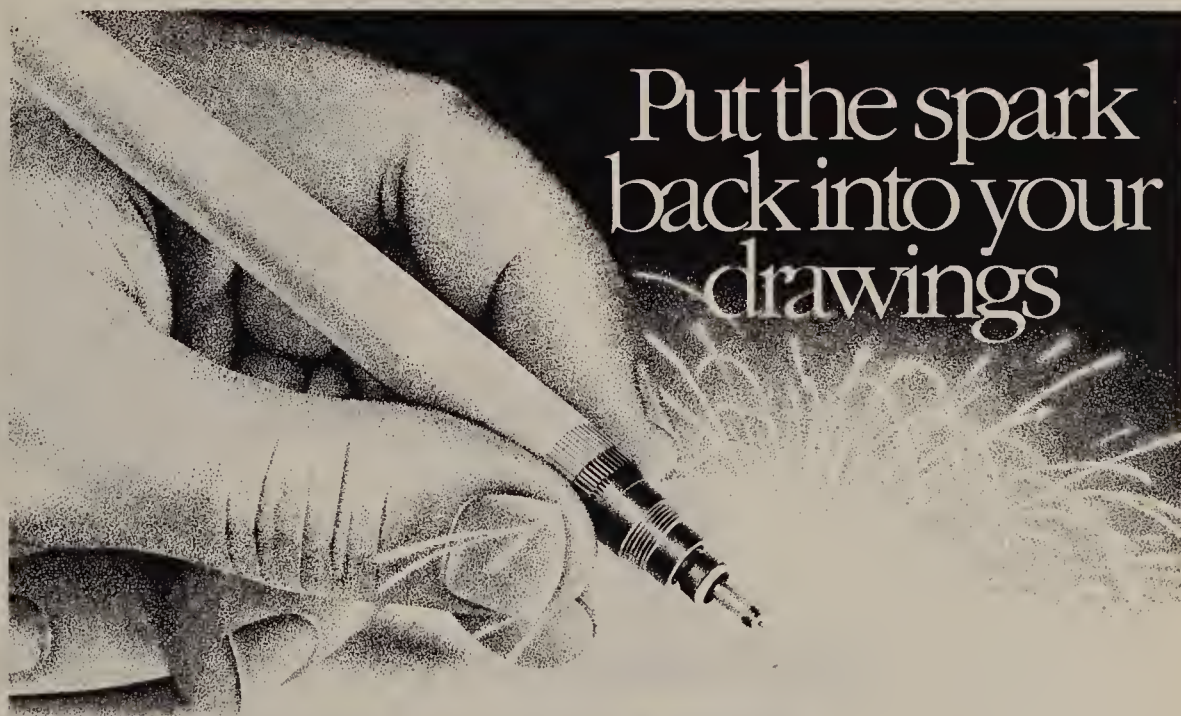
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An Apple for the Brain

BY STEVEN LEVY

MY SOURCE INSTRUCT-
ed me to meet him in
the rear booth of Fu Bar's
restaurant, a squalid
dive in San Jose. When
I asked him why there,
he gave me a high-
pitched, nerdy laugh.
"The food's so bad that
no one I know would
ever be seen there!" he
crowed, delighted at his
ingenuity. At the appointed time there he
was, having ordered for both of us, jab-
bing his chopsticks into the greasiest pot
sticker I'd ever seen.

"Oh, hi," he greeted me, dipping his
food in the chili sauce and stuffing it in his
mouth. "Not hot enough!" he yelled to
the waiter. "Get me hotter sauce!" The
waiter scrambled back to the kitchen and
began a heated exchange in Chinese.

"See?" said the source, who for obvi-
ous reasons I will not describe. "This is
the perfect rendezvous for a confidential
meeting!"

I sampled the kimchee. Bland. "This
better be good," I said.

"Oh, this is good," he assured me.
Then his face went dark, as if he was re-
considering. He looked around the small
storefront restaurant, even though we
were the only diners. He reached in his
pocket and pulled something out, but kept
it in his closed fist. Another pause. I was
getting impatient, about ready to walk
out, but something in his manner made
me stick around. He was no longer cocky.
This was one scared dweeb.

Finally he opened his hand. "Know
what this is?"

I considered the piece of plastic in his
hand. It was the size of a beetle, the same
off-white color as my Mac II, and had a
very tiny multicolor Apple logo. A centi-
pede-like row of metal connectors pro-
truded from the bottom. "Some sort of
encased computer chip?" I said.

He took a deep breath and slapped the
thing to his head behind his right ear. It
stuck there like a bolt in the head of the
Frankenstein monster.

What the hell . . .

His voice deepened. "Open Finder,"
he said, as if to himself, waiting a second
and then nodding in recognition of some-
thing I couldn't see. "Open Schedule."

Pause. "List appointments for Friday." He
looked up. "Dentist at 9 a.m. I *hate* den-
tists! Fax dentist. Tell him to cancel." He
smiled, then began talking to himself
again. "Open Excel. Open file called Base-
ball Statistics." He looked at me. "I know
you like baseball." I saw that the chip was
firmly lodged behind his ear. "All right,
I've opened an Excel spreadsheet of the
American League," he said. "Ask me the
batting average of any player."

"Um, Mark McGwire?"

"He hit .268, with 104 ribbies."

"Look, a good baseball fan would
know that."

"Alphabetically, next comes Mark
McLemore, who hit .246. Brian McRae,
.223. Kevin McReynolds, .246. Those
four players had a total of 392 hits in 1601
at-bats, and as a group they hit . . . I'm set-
ting up the formula . . . Yes! .245." He
smiled. "I can, quote, see, the spreadsheet,
as clear is if it were on a monitor. Hot-
wired to the optic nerve."

I wasn't buying it—yet. "All right,
how many doubles did the Seattle Mari-
ners outfield hit?"

He told me, and tossed me a *Baseball
America* stat book so I could check. I asked
him a dozen more questions, and he got
them all. Then he closed Excel, opened
Mathematica, and solved some quadratic
equations with it. He opened a WriteNow
file and began reading from a William
Gibson novel. Finally, he
pulled out a portable phone,
ran a tiny wire from it to the
chip behind his ear, and began
reading from obscure news
groups on the Internet.

The Long and Winding 'Trode

IT WAS REAL. "YOU'VE GOT A
computer in your head!" I said.
"A brain electrode—what
cyberpunks call a 'trode.
Apple's actually made one?"

"Yeah," he said, carefully
removing the 'trode from be-
hind his ear, wincing in pain
when it came clear. "Wait a
minute." He shakily reached
for a glass of water and drank
it like he'd just wandered in
from the desert. His eyes
looked all fuzzy. "Damn," he

whispered to himself, cradling his head in
his hands. Then he looked up, and his
eyes were clear. "More chili sauce!" he
bellowed to the kitchen. "Hotter!"

This was hot, indeed. I decided not to
push him. We ate the shredded liver
(Szechuan style) in silence. Then, wiping
a few grains of rice from his chin, he
spilled the story.

"Apple began working on the thing
not long after the Newton project. As you
know, Newton is supposed to be the be-
all and end-all in portable technology. But
we were late out of the gate. Before we
ship Newton, we'll see other so-called
personal digital assistants from a dozen
other companies—EO, GO, and some
with even more than two letters in their
name. And you know what? They're all
going to fail."

"How can that be?" I asked. "Didn't
they pass some law saying that PDAs are
the future?"

"Hah! The big thing about PDAs is
that they give you the information you'd
need just off the top of your head—the
kind of things you want to know without
hammering commands into a computer,
or even with a little pencil that recognizes
your handwriting. But the tests we've
done with prototypes show that they have
a useful life of two weeks. If you use them,
you lose them. People sit on them, close
car doors on them, leave them in cabs.

And if someone swipes your
PDA the crook has all the de-
tails of your life. That's the
problem with PDAs—they're
not attached to you."

He cracked open a fortune
cookie, looked at the fortune,
shrugged, and popped the
cookie into his mouth. "So
then Apple gets hold of this
guy from the former Soviet
Union. Turns out he'd been a
techie for the KGB and had
stolen plans from our own
government on this 'trode
technology. The key is inte-
grating the information with
brain waves. We were very
lucky—it turns out that the
Finder is the only interface
that could possibly do this.
MS-DOS, even Windows, are
continues



*The
future is
lodged
behind John
Sculley's
ear*

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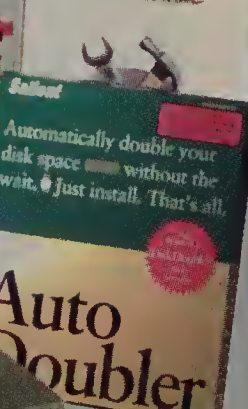
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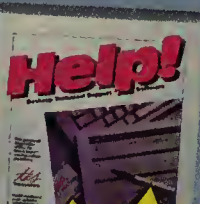
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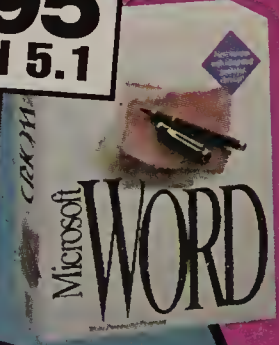
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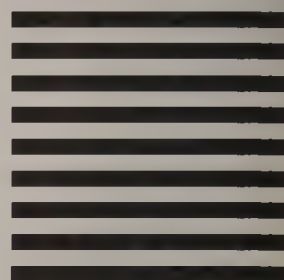
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too, uh, brain-damaged. We combined this stuff with our voice-recognition technology, and got the thing working."

He was almost shouting now. "Imagine the possibilities! A personal information manager, with software agents—in your head! With a simple wire connection, you can output faxes! You can do spreadsheet models—with your eyes closed! You know how people always say that they've been writing a book in their head? Well, now they can just hook their brain to a serial port and print out the sucker!"

"This sounds amazing!" I said. "Everyone is going to have one of these gadgets stuck behind their ear."

Neural Net Loss

"WELL, THAT'S WHAT WE THOUGHT, at first," said the source. "But then we started having these—these problems."

"Problems?"

He started to fidget. "It started when Sculley insisted that he get the first prototype installed on his own head. He thought it would save time memorizing speeches, and he never liked using a mouse anyway. Since this was a secret project, we had to surgically implant the chip. It turned out to be a risky proce-

dure—the guy's got such a bony head and all. But he got through OK—in fact, it didn't take much longer than installing System 7. After Sculley got one, of course, the rest of the executive staff had to get their own 'trodes. It got to be the macho thing around Apple to duck into the Betty Ford Clinic and get a 'trode installed."

"So what was the problem?"

"At first it worked great. Sculley's speechwriters would download text into the 'trode, and he'd take right off. We even considered spicing up the presentations with sounds from 'Star Trek'—they'd come out of his mouth and he'd sound like Bobby McFerrin. But we figured that would be too weird. As it was, things got even weirder."

"Weirder?"

"Yeah. We started hearing things from him that made no sense. No sense at all. The first inkling came at a product meeting. We presented Sculley with a list of six possible new Mac computers to develop, asking him to pick the one we'd ultimately ship. He told us to complete all of them. And at the *next* product meeting, he told us that he wanted even more!"

"Maybe he figured that the Macintosh line needed more diversity."

"No, it was crazy. He kept asking for more and more CPUs. The Performas. The Mac IIvx. More PowerBooks. Duos. With CD ROM. Without CD ROM. And new operating systems—PowerPC, Pink, Kaleida, Sweet Pea, Newton. Used to be that we did a big product intro every year or two. Now we do five or six a year, and each time we introduce a half-dozen machines. And of course, if any of the machines turn out to be popular, we don't have enough of them. The PowerBook 180, for instance—if you order one today, you can expect delivery by 1998, and only if you leave a deposit."

"By 1998?" I asked. "That's not bad—I was hearing turn of the century."

"Well, maybe 1998 is optimistic," he admitted. "But that's beside the point. Do you know that Sculley told us that next year he hopes to introduce a new model of Macintosh every day except Easter, Christmas, and Martin Luther King Day? We kept asking ourselves, why is he doing this? And then we figured it out. It was the 'trode talking! The 'trode wanted us to make more and more computers. It had taken over Sculley's thought processes."

"Like *Invasion of the Body Snatchers*?"

continues

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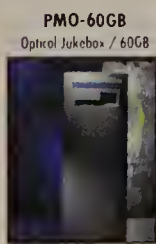
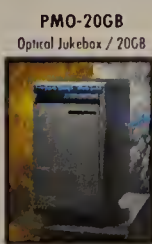
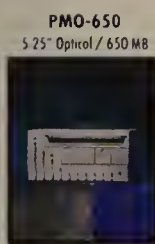
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"Wasn't Sculley even being considered as Clinton's vice president?" I asked.

"What a disaster that would have been—a robotic automaton one heartbeat away from the presidency!" my source groaned.

"It's happened before," I pointed out.

"True, but it's something else entirely to take marching orders from a hunk of silicon. Apple is already infiltrated beyond repair—all the executives are in total mind-sync with Sculley. We were going to make every employee at Apple wear one, but since we reorganize so often, we figured that wouldn't be cost-effective."

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"To warn the world," he said. "Apple has diverted incredible resources in order to ship these in a year. Every yuppie is going to want one. At first, everything will work fine. But then his or her behavior will change. Instead of massaging spreadsheets, people will save up their money to buy more 'trodes—parallel-processing 'trodes! At a certain point, the computers will have more power than the brain. And at that point, everyone will start acting like a robot."

"That is a scary prospect," I said. "But how have you managed to avoid being taken over?"

He smiled. "As it turns out, there is a way to cancel out the 'trode's power. It involves getting a *different* 'trode installed behind your other ear." He smiled, and reached in his pocket, handing me another object. "It's buggy, and it won't ship on time, but it's an effective antidote."

This object was similar to Apple's 'trode, but slightly larger and finished in matte black. On it was stamped the words "Property of Microsoft."

"Of course, there's going to be a lawsuit when Microsoft tries to release it," said my source matter-of-factly.

At that point, six beefy men wearing dark suits rushed into the restaurant. If you looked closely, you could see white plastic bumps behind their ears. "There he is!" said the first one in, pointing to my source. "He's taken the 'trode off! Shoot him!" The source dashed into the kitchen and I followed him as he ran past the astonished cooks and through the back door. After ducking behind a truck loaded with Sun workstations, we seemed to be clear of our pursuers.

"Maybe I shouldn't have talked to you," he said. "But it was essential to let people know about this." Before we parted, he downloaded a transcript of our conversation into my PowerBook—he had been recording the whole thing from his 'trode, using his own ear as the microphone. I dragged the file into a folder called April Fools' Column, and barely made it to my next appointment—an Apple press conference announcing 16 computers.

Sixteen new CPUs? Must be a slow month. **m**

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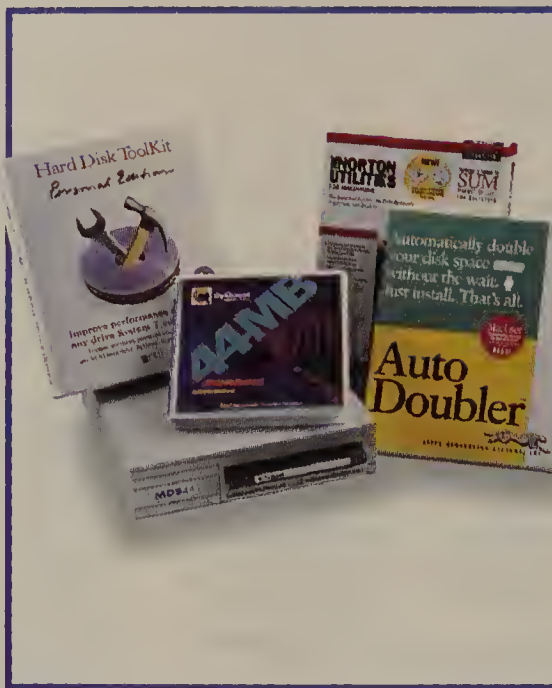
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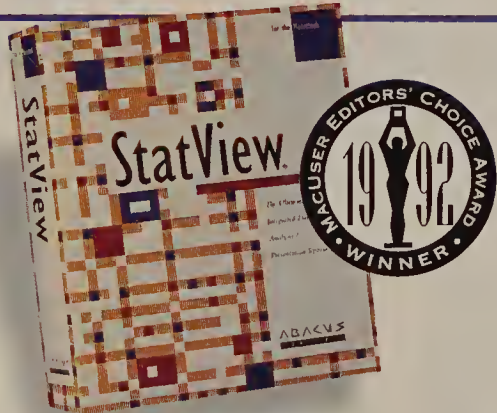
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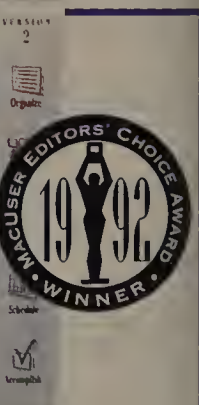
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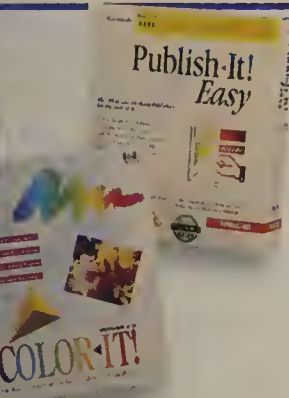
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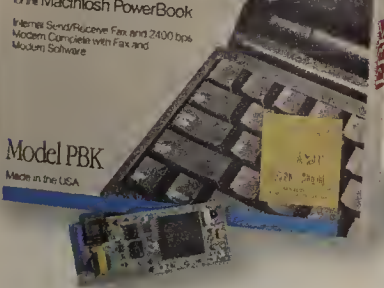
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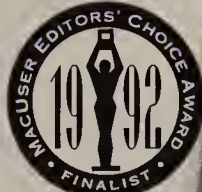
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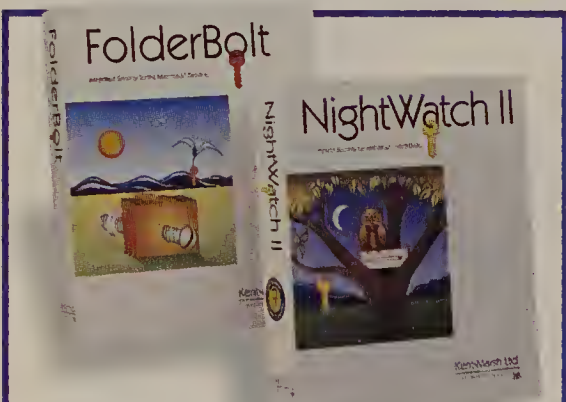


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9115 **DiskFit Direct 1.0**.... 29. 3393 **Pro**.. 72.
5255 **Retrospect** 147. 7945 **Remote 1.3** 264.
★ **Datawatch ... 30 day MBG**
4803 **Virex/Mac or 8561 911 Utilities**..... 62.
Delta Tao
10755 **WonderPrint**..... 36.
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4287 **PYRO! 4.01** 27. 3955 **Suitcase 2.1** 53.
8286 **SuperLaserSpool 3.0**..... 99.
7404 **DiskDoubler** 52. 4838 **AutoDoubler**.. 58.
10398 **CopyDoubler** 39. 7704 **Public Utilities** 98.
FWB, Inc.
7929 **Hard Disk ToolKit Personal Edition**.... 49.
2999 **Hard Disk ToolKit 1.1.1**..... 125.
ICOM Simulations
6296 **Intermission**.. 27. 3731 **OnCue II**.. 63.
★ **Inline Design ... 30 day MBG**
1744 **Icon 7**.... 31. 9843 **Inline Sync 1.0** 79.
7068 **INITPicker**.. 49. 10731 **PBTools**... 62.
2913 **Redux 1.63**.... 49. 1740 **Deluxe**.... 92.
Insignia Solutions
7552 **RapidTrak**..... 58.
★ **Kent Marsh Ltd. ... 30 day MBG**
9513 **FolderBolt 1.02C**..... 71.
1839 **NightWatch II 2.01**..... 89.
10498 **FolderBolt/NightWatch II Bundle**..... 129.
★ **KyZen Corporation ... 30 day MBG**
10173 **UP Diff 1.0**..... 125.
★ **Leader Technologies ... 30 day MBG**
10272 **PowerMerge 1.0**..... 79.
★ **Logical Solutions ... 30 day MBG**
10169 **7th Heaven 2.5**..... 67.
★ **MAXA Corporation ... 30 day MBG**
10771 **Snooper 2.0 HW & SW Kit**..... 179.
10772 **Snooper 2.0 (software only)**..... 129.
MicroMat Computer Systems
3732 **MacEKG II 2.0.5**..... 89.
★ **Nine to Five Software ... 30 day MBG**
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★ **Now Software ... 30 day MBG**
1793 **Now Up-To-Date**... 65. 2366 **(10)**.. 519.
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8210 **PLOTTERgeist 2.1**..... 249.

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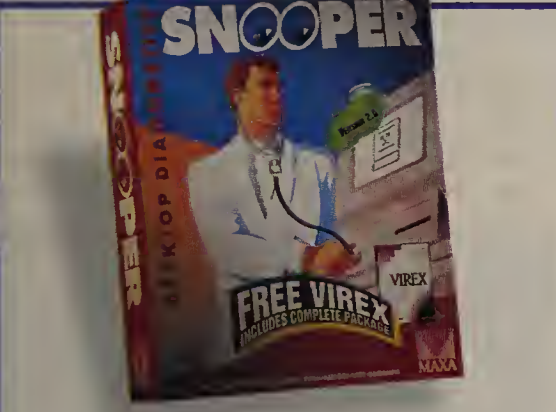


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4753 **Frontier 2.0**—1992 MacUser Editors' Choice Award for Best Development Tool. Power-user's scripting system for System 7. "Mac users have wanted something like this since 1984," (MacUser 12/91) **\$185.**

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10312 **AntiVirus for Mac 3.5 (SAM) Upgrade** 24.
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5203 **Help!** 88.
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UserLand Software
4753 **Frontier 2.0** 185.

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2470 **Lost Treasures of Infocom Vol. II.** 29.
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6516 **The Playroom 2.0 (CP) (color)** 29.
Carmen Sandiego Series (CP) ea. 29.
8285 **Where/World Carmen Sandiego Deluxe** 47.
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8266 **SimEarth 1.1** 40.
1910 **SimLife** 41. 3307 **A-Train** 39.
Buena Vista Software
1711 **Heaven and Earth** 34.
Bungie Software
8585 **Minotaur 1.01B** 47.
★ **Carina** ... 30 day MBG
7761 **Voyager II, the Dynamic Sky Simulator** 99.
★ **Centron Software** ... 30 day MBG
5910 **Crossword Creator** 39.
8525 **Casino Master**... 39. 8524 **(Color)**. 45.
Colorado Spectrum
2554 **Mouse Yoke (aircraft yoke adapter)** 29.
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6320 **Manhole 1.6** 19.
★ **Davidson & Associates** ... 30 day MBG
3922 **Talking Spell It Plus** 28.
2574 **MathBlaster Plus** or 7942 **Kid Works 2** 34.
Delta Tao Software
2536 **Spaceward Ho!** or 2439 **Strategic Conq.** 36.
EARTHQUEST
8050 **EARTHQUEST** or 3118 **Ecology 1.0** 34.
★ **Edmark Corporation** ... 30 day MBG
7155 **Kid Desk** 24. 7318 **Millie's Math House** 29.
Electronic Arts
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2805 **PGA Golf Tournament Course** 18.
★ **Expert Software** ... 30 day MBG
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8083 **Missions at Leyte Gulf (req. Hellcats).** 20.
4756 **Hellcats Over the Pacific 1.0.3** 38.
★ **Great Wave** ... 30 day MBG
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1513 **ReadingMaze (Color, ages 3-7)** 35.
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Pronunciation Tutor
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Innerprise
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1894 **BattleChess (3D animation)** 29.
1893 **CheckMate (infinite play levels)** 31.
★ **Learning Company** ... 30 day MBG
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9570 **Reader Rabbit 2 1.0 (ages 5-8)** 34.
3281 **The Writing Center 1.0** 51.
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7126 **Reunion 3.0** 115.



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- ★ **MECC** ... 30 day MBG
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MicroProse
9520 **Civilization: Sid Meier's** 39.
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2868 **Flight Simulator 4.0 (CP)** 42.
★ **Nordic Software** ... 30 day MBG
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6740 **StuffIt Deluxe 3.02**—1992 MacUser Editors' Choice Award for Best Compression Product. Solves all your needs from archiving to transparent compression..... **\$65.**
7410 **StuffIt SpaceSaver 3.4** 34.



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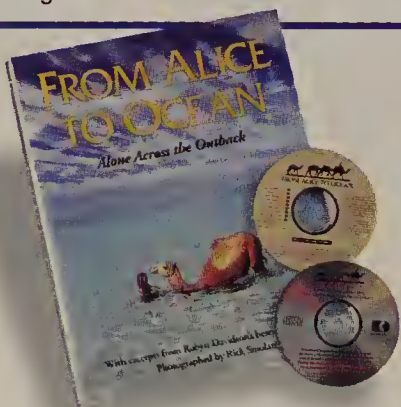
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9078 **Stellar 7** 21.
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2934 **Spectre**... 34. 5280 **LAN 3-Pak**..... 57.

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9063 **Futura LX**..... 999.
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5486 **Sound Edit PRO** 199. 7651 **Action!** 349.
4598 **MacRecorder Sound System PRO**... 239.
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2246 **MacroMind Three-D 1.2**..... 999.
NEC
4252 **MultiSync 3FGx** 689.
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15" Monochrome System for the II, LC, SE/30, si and SE ea. 519.
Passport Designs
10362 **Passport Producer**..... 249.
8250 **Encore 2.5.2** 379.
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1738 **PrecisionColor Pivot (reqs. interface)**.. 999.
7870 **Rocket 33** 2199.
1736 **PrecisionColor Display/20S**..... 2499.
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8944 **RasterOps 24STV** 799.
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6944 **Power Portrait (platinum)**..... 679.
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5201 **The Miracle (piano teacher)** 349.
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Star Trek: Next Gener. Vol. 1 or 2.... ea. 35.
1759 **AudioClips: 2001 A Space Odyssey**.. 35.
★ **SuperMac Technology ... 30 day MBG**
4122 **VideoSpigot LC**.... 255. 4114 **Ilsi**.... 339.
4164 **VideoSpigot (for NuBus)**..... 379.
7676 **VideoSpigot Pro or 3691 Pro si**... ea. 1099.
9074 **Spectrum/24 PDQ+** 1649.
10286 **Spectrum/24 Series IV** 889.
7679 **Spigot & Sound**.. 489. 7678 **Pro**... 1189.
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9075 **21" SuperMatch Color Display** 2699.
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3730 **Just Grandma and Me** 34.
CD Technology
2321 **CD-ROM Caddy** ... 11. 2533 **(5 Pack)** 49.
4084 **America Alive! (CD-ROM)** 75.
8057 **Porta Drive CD-ROM**..... 579.
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10146 **Who Killed Sam Rupert?** 24.
8739 **Beyond the Wall of Stars** 40.
8744 **Total Baseball** 40. 2484 **Family Doctor** 45.
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7111 **Battlechess CD-ROM** 45.



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3915 **Grolier Encyclopedia** 249.
Wayzata Technology
Font Pro Vol. 1 & 2 ea. 62.
8219 **CD Fun House 35. 10188 Macnificent 7** 48.

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7073 **Mac PC Exchg.** 569. 7102 **AppleShare** 969.
7101 **AppleTalk Remote Access** 149.
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8362 **QuadraLink (with AE Shadow)** 269.
10361 **QuadraLink DMA** 399.



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3392 **Star Trek: The Screen Saver**—1992 *MacUser* Editors' Choice Award for *Best Desktop Diversion*. Beam aboard the Enterprise to prevent screen burn-in \$34.
5737 **After Dark 2.0w** 28.

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- ★ **Argosy Software ... 30 day MBG**
- 72 7Software Bridge/Mac 2.0.1 \$99.
- Asanté Technologies, Inc.**
- Full line of Ethernet Adapters..... call
- 75 10/T Hub-8 249. 2772 10/T Hub-12 .. 499.
- Friendly Net Adapters..... ea. 79.
- ★ **CE Software ... 60 day MBG**
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- ★ **CompuServe ... 60 day MBG**
- 76 7Mac Membership Kit 2.0..... 25.
- 73 7CompuServe Navigator 3.1 49.
- 74 7Membership Kit/Navigator Bundle 72.
- ★ **DataViz ... 60 day MBG**
- 42 7MacLink Plus/Translator 7.0 109.
- 23 7MacLink Plus/PC 7.0 129.
- ★ **Dayna ... 60 day MBG**
- DaynaPORT TRX: (BNC or 10 BASE-T) ea. 87.
- DaynaPORT E: (BNC or 10 BASE-T) ea. 149.
- DaynaPORT SCSI/Link (BNC or 10 BASE-T) 269.
- 719 EtherPrint 339. 9888 (10BASE-T) ea. 339.
- 62 PathFinder..... 599.
- 359 7Network Vital Signs 1.0 249.
- ★ **Dove Computer ... 30 day MBG**
- 758 7DoveFax 2.3 .. 199. 3352 NuBus ... 199.
- 34 7DoveFax+V ... 299. 4111 NuBus.... 299.
- 199 7DoveFax Pro..... 399.
- 200 7DoveFax Pro+V 499.
- ★ **Dow Jones ... 30 day MBG**
- 295 7Dow Jones News Retrieval Membership 24.
- ★ **Farallon Computing ... 30 day MBG**
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- 142 Ether10T-Starlet..... 279.
- 726 Farallon Concentrator PN710-1 1999.
- 369 PhoneNET Connector 10-Pk (DIN8) ... 195.
- 206 PhoneNET StarController 307..... 879.
- 302 Star 357... 899. 4814 Star 377 1299.
- 305 7Timbuktu 5.0 or 4866 7/Remote 5.0 129.
- 513 7Timbuktu Remote Twin Pack..... 199.
- 516 7PowerPath 105. 9518 7LocalPath 139.
- ★ **Freesoft ... 30 day MBG**
- 115 7White Knight 11 85.
- ★ **Global Village ... 30 day MBG**
- 174 7TelePort/Bronze..... 197.
- 175 7TelePort/Silver 369. 2179 Gold 429.
- Hayes**
- 101 7HayesConnect 3.0 (modem sharing).. 73.
- 300 7Smartcom II Mac 84. 3226 Upgrade. 44.
- 971 7OPTIMA 24..... 145.
- 970 7OPTIMA 96..... 389.
- Insignia Solutions**
- 557 7Access PC 59. 3441 7SoftNode 2.0 .. 99.
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- 554 7SoftPC Professional..... 195.
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300 7Smartcom II 3.4—1992 MacUser's Editors' Choice Award Finalist for Best Communications Product. Reliable, easy-to-use communications and peripheral-sharing software \$84.

226 7Smartcom II 3.4 Upgrade..... 44.

- Logicode Technology**
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- 5524 7M9696XV 289. 5523 7M1414XV 299.
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- 2280 7MASSfm 24/96N Network Fax..... 349.
- ★ **Practical Peripherals ... 30 day MBG**
- 8994 2400 V.42bis Modem 125.
- 7934 PM9600SA Modem 1.26 289.
- 9849 7SmartPack 9600 (with Smartcom II). 349.
- ★ **Prometheus ... 30 day MBG**
- 4724 7Home Office (24/96 w/Voice Mail).... 185.
- 8990 7Ultima Home Office (144/96) (w/VM) 375.
- PSI Integration, Inc.**
- 3143 7COMstation ONE... 142. 3142 7TWO 247.
- 5340 7COMstation FOUR 369. 6965 7FIVE 439.
- ★ **Shiva ... 30 day MBG**
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- 4347 7NetBridge or 4942 7TeleBridge ... ea. 399.
- NetModem/E (thick, thin, 10BASE-T) ea. 1479.
- Sitka/TOPS**
- 6264 7TOPS Network 3.1 187. 2419 (3-Pak) 249.
- ★ **Software Ventures ... 30 day MBG**
- 1964 7MicroPhone II... 139. 3455 Pro... 209.



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10359 7Network Vital Signs 1.0—1992 MacUser's Editors' Choice Award Finalist for Best Network/Connectivity Software. A powerful, modular fault monitoring application that alerts network managers to problems with AppleTalk devices \$249.

- Sonic Systems, Inc.**
- 7572 7LaserBridge 135.
- 7571 7PowerBridge 99. 7573 7SuperBridge 169.
- ★ **Sophisticated Circuits ... 30 day MBG**
- 10172 Desktop Dialer..... 47.
- ★ **STF Technologies ... 30 day MBG**
- 7644 7FaxManager Plus 74. 7638 LC..... 25.
- ★ **Synergy ... 30 day MBG**
- 6618 7VersaTerm 4.6.. 90. 6619 PRO 3.6 177.
- 7380 7VersaTilities 1.0 59.
- ★ **TechWorks ... 30 day MBG**
- 1582 7GraceLAN 275. 1763 7Hubworks-8 249.
- Ethernet Cards..... call
- Twincom**
- 10335 724/96 Commuter..... 122.
- 10332 714.4 Pro (14.4/14.4 for External)..... 329.
- 10337 714.4 Voyager (14.4/14.4 for Pocket)..... 362.
- ★ **White Pine Software ... 30 day MBG**
- 2404 7Mac 320..... 95. 3544 7Exodus 4.0 199.
- ★ **Zoom Telephonics ... 30 day MBG**
- 1168 7AMX Modem (2400 baud) 62.
- 7757 7Fax/Modem AFX (9600S/4800R) 74.
- 2310 7FX9624 Send/receive Fax/Modem..... 99.
- 3576 7FX9624V Send/receive V.42 Fax/Modem 128.
- 1179 7V.42bis Modem (with MacPack)..... 125.
- 2311 7V.32 Modem.. 199. 4698 V.32bis. 229.
- 3553 7Fax/Modem VFX V.32bis..... 259.
- 7917 7Pocket FaxModem..... 99.



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- 2769 MousePen Pro Mac..... 65.
- Caere**
- 4476 7OmniPage... 459. 7705 7Direct..... 259.
- 4930 7OmniPage Professional..... 649.
- Canon Computer Systems**
- 10105 BJ200 (with GDT PowerPrint) 449.
- ★ **CoStar ... 30 day MBG**
- 7Stingray ADB (platinum or black) . ea. 79.
- 1884 7LabelWriter II.. 185. 1880 7Plus..... 239.
- 10300 7Address Express 689.
- ★ **Curtis Manufacturing ... 30 day MBG**
- 8046 MVP Mouse (MVP-1) 89.
- ★ **Datadesk ... 30 day MBG**
- 9830 7MAC101E 129. 2384 7w/QuicKeys 159.
- Dataproductions**
- 10318 7LZR 960 Printer 1699.
- 10319 7LZR 965 Printer 2599.
- 10326 7LZR 1560 Printer - 2 Tray..... 3199.
- ★ **GDT Softworks ... 30 day MBG**
- 2499 7PowerPrint 94. 10171 7PowerPrint LT 259.
- Hewlett-Packard**
- 6514 HP B&W DeskWriter (w/cartridge) 479.
- 2964 HP Color DeskWriter C (w/color cart.)... 599.
- 9993 HP LaserJet IIIP (requires kit) 1099.
- 8368 HP LaserJet 4 (with toner)..... 2249.
- ★ **Kensington ... 30 day MBG**
- 2547 7Turbo Mouse 4.0 ADB..... 107.
- Key Tronics**
- 6974 7Mac Pro + Kybrd. 139. 1070 TrakPro 219.
- Kraft**
- 7519 KM30 Joystick 42.
- ★ **Logitech ... 30 day MBG**
- 1671 7MouseMan... 77. 1672 7TrackMan .. 89.
- 5082 7ScanMan Model 32 G-Scale Scanner 299.
- 7112 7FotoMan with Digital Darkroom 639.
- ★ **MicroSpeed ... 30 day MBG**
- 2807 7MicroTRAC ADB (for SE & II family) .. 57.
- 6621 7MacTRAC ADB 2.0 (SE & II family).... 75.
- Microtek Labs, Inc.**
- 5438 7ScanMaker II.. 929. 5441 7Iixe.. 1239.
- Monster Design Group**
- 1486 MacSpeakers (two, stereo) 169.
- ★ **Mouse Systems ... 30 day MBG**
- 7520 7Little Mouse ADB or 8001 7Plus ea. 68.
- 9471 7A³ Mouse..... 74.
- NEC**
- 5377 SilentWriter Model 95..... 1479.

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★ Pacific Data ... 60 day MBG

7958 LaserJet IV 2 MB \$109. 7965 (4 Pack) \$399.

7959 LaserJet IV 4 MB 165. 7966 (4 Pack) 599.

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8009 ⓈPowerKey 2.01. 75. 8008 ⓈRemote. 32. Thunderware

4994 ⓈLightningScan 400 359. 3107 Pro 256 489. WACOM

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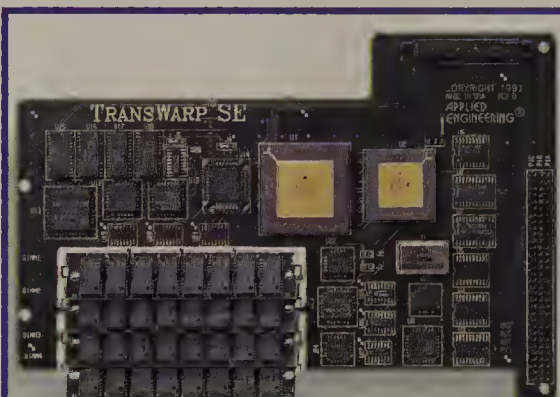
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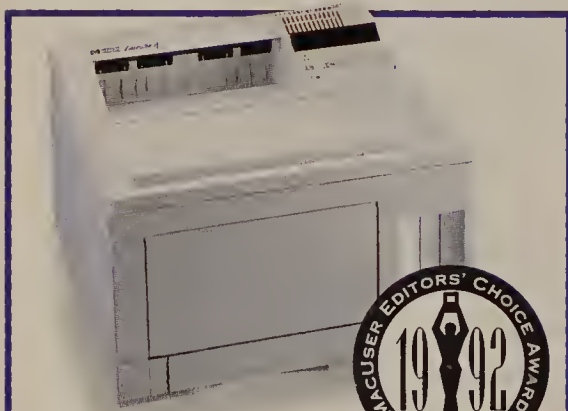
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Circle 229 on reader service card

Swap Tips around the World

BY DEBORAH BRANSCUM

AN INVISIBLE WEB OF COMPUTER connections wraps the earth, making it possible to swap shareware, advice, and technical tips with Macintosh users around the world. Like the local bulletin board systems (BBSs) I wrote about last month, global networks offer users access to valuable information on computing and other topics, although on a much larger scale.

These systems link a variety of computers and individuals, placing university networks, scientific research centers, and commercial enterprises within hailing distance of each other. The best-known networks are Usenet and Internet. These noncommercial networks are not actual organizations but rather collections of linked computers, usually private, with administrators who allow their systems to carry messages or transmit files.

Such networks can be daunting to those accustomed to America Online or CompuServe. There's no Usenet Czar to forward complaints to; no Internet customer service rep to hold your hand. And it may take time to learn cryptic Unix commands or locate a source for specific information. But the investment in time and patience will pay off, especially if you are comfortable exploring new frontiers.

Investigating Internet

INTERNET IS A 24-YEAR-OLD NETWORK linking an estimated 1.5 million machines. This patchwork of government, university, and private computer networks began life as a project of the U.S. Defense Advanced Research Projects Agency in the late 1960s. Although some segments of Internet are federally subsidized, many are not, and commercial enterprises are expected to play an increasingly important role in the network's future.

In the meantime, Macintosh users benefit from Internet by swapping information with others via Internet mail; subscribing to discussion groups, called mailing lists, that volunteers maintain; and exploring Mac-specific files kept on various hosts. The daily InfoMac Digest (via info-mac@sumex-aim.stanford.edu) tracks technical Mac queries, bug reports, software ports, and the like. (I give it 3 stars.)

It would be a shame to limit your inquiry to the Mac, however, when Internet offers access to so much more. *The Whole Internet User's Guide & Catalog* (O'Reilly & Associates, 1992) lists resources covering close to 60 topics, including aeronautics, education, health, physics, and even zymurgy. Library of Congress records can be accessed (via telnet dra.com using VT100 emulation), for example. In the health field, the National Cancer Institute provides CancerNet, which offers cancer-treatment guidelines (updated monthly) that give users an opportunity to evaluate their treatment against the Institute's recommendations. (For a list of treatments, send the message **help** to cancernet@icicb.nci.nih.gov. Leave the subject field blank.) Anyone in education can benefit from the Federal Information Exchange (connect via telnet fedix.fie.com; the log-on is **fedix**), which links colleges, universities, and government agencies, providing information on research programs, fellowships, and more. Closer to home, the federally funded Computer Emergency Response Team (connect via ftp.cert.sei.cmu.edu; **cd pub**) focuses on computer and network security issues and provides papers on security issues and tools.

There's plenty of reason to connect to Internet, but gaining access is much more difficult than simply dialing up a BBS, unless you work for a business or research facility that already has Internet connections. Thankfully, a growing number of commercial services, including CompuServe, offer links to Internet.

For this article I tried out two private services that offer Internet accounts: WorldLink E-Mail from InterCon Systems Corporation (703/709-9890 or 800/638-2968) and HoloNet from Information Access Technologies (510/704-0160 or via modem to 800/638-4656). WorldLink E-Mail is a fairly painless system that offers file transfer and electronic mail via Interlink for \$19 per month at 2400 bps and \$29 at 9600 bps; there is no message limit. At this writing, you can dial directly from more than 35 cities. (World-

Link Advanced, due out later this year, will offer real-time file transfer, E-mail, and browsing.)

HoloNet is primitive by Mac standards—there's no graphical interface whatsoever. But the menu-driven interface is easy to understand and there's plenty of online help and tools to help you search for information. Unlike WorldLink, HoloNet lets Internet users chat interactively and play or observe games. (Internet boasts the world's largest chess club.) HoloNet can be dialed directly from 850 cities. Connection costs are \$4 per hour during peak time, with a \$6 monthly minimum. You can transfer 1MB of data per hour; additional data transfers are \$2 per megabyte.

Usenet

USENET (FROM USER'S NETWORK) began in 1979 with a student-written program that linked Unix-based computers at two universities. Usenet discussion areas, called newsgroups, are generally distributed over host computers (not always Unix-based) using the UUCP protocol, but personal computer users also can access the newsgroups. Usenet spans five continents and connects an estimated 400,000 computer systems. It also has gateways to Internet and other networks.

Usenet is chat city. It's a distributed network designed to let people read and respond to messages. The Macintosh newsgroups cover announcements, applications, communications, games, hardware, HyperCard, programming, the system, databases, and more. Newsgroups fall into the core categories, which include business, computers, and defense data networks, and also cover alternative topics, ranging from cyberspace to privacy to recovery to Spam. Not all hosts carry all newsgroups, but an increasing number of Macintosh user-group BBSs carry the Mac newsgroups. (See last month's *Conspicuous Consumer* for more on MUG BBSs. But please note that the correct number for the NYMUG is 212/473-1967.)

continues



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Many of the computer hosts that carry Internet also carry Usenet newsgroups. The newsgroups are also available through HoloNet.

Fetching FidoNet

ANOTHER GLOBAL NETWORK IS FIDO-Net, a large, feisty group of individual BBSs. FidoNet is like a club that admits anyone who can figure out where the meetings are held and understands the lingo. It's not meant to be a secret society, but it can feel that way to a frustrated user searching for the Nodelist file, which lists the name, location, and phone number of every FidoNet BBS around the world. To find a local Fido BBS, check *Computer Monthly* or *Computer Shopper*, one of those hefty publications sold on many newsstands. (Or bite the bullet and make a long-distance call to Twilight Clone at 301/946-3070. This Washington, D.C., BBS is primarily devoted to Mac-related issues, although it doesn't use a graphic interface. Cool board, though.)

FidoNet fans—and there are many—like the noncommercial nature of the network and its easygoing callers. The closest thing to a FidoNet motto is "Don't be easily annoyed and don't be excessively annoying." People who crave hierarchy

will be in for a disappointment—FidoNet is a store-and-forward network made up of 16,000-plus BBSs run by relentlessly independent system operators who do whatever they want. That said, most sysops are receptive to callers and will add specific message areas, called echoes, to their boards if there is enough interest.

And when it comes to FidoNet, echoes are where the action is. The system was designed to provide a fairly fast, fairly inexpensive way to transmit messages in the wee hours of the morning. There's a Mac question-and-answer echo as well as echoes on System 7, desktop publishing, HyperCard, communications, hardware, software, and more. It's not the fastest system around, but it works. Lots of Mac-oriented BBSs take part in FidoNet, including the Arizona Macintosh Users Group (602/553-0721).

Netiquette

OVER THE YEARS A KIND OF ONLINE etiquette, dubbed *netiquette*, has evolved to help people save time, money, and hurt feelings while using E-mail. A lexicon of sideways so-called smiley faces—such as this :-)—has even evolved to add emotion to written messages that might be misread otherwise, since readers can't see facial ex-

pressions that normally accompany sarcastic or humorous comments.

Being misunderstood is one of the most common hazards of communicating online. Another risk is revealing too much about yourself or a coworker. Alone at a computer, you may imagine your comments are private and confidential, going out to only a few close friends. In fact, if posted in a public area, your words are spinning out over thousands of systems and, if ill-chosen, may damage your reputation, jeopardize your job, or ruin a friendship. Never post anything in anger, and never post anything you wouldn't want your boss, best friend, worst enemy, or spouse to read.

Don Rittner, author of *EcoLinking* (Peachpit Press, 1992), advises against responding to a message unless you add something meaningful to the discussion. "Don't clutter up the pipeline with useless babble."

Other tips: Don't type in all caps—it's the online equivalent of shouting. Remind people of what you are responding to by including the pertinent parts of the original message at the top of your reply. And make your point as succinctly as possible.

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issue on Internet, since many of the networks in the Internet are federally funded. In *The Whole Internet Catalog & User's Guide*, author Ed Krol warns that politically damaging actions include excessive game playing; hateful, harassing, or other antisocial behavior; and intentional damage to or interference with others.

Rittner adds, "Don't get personal, or you'll get 100 people lashing you from head to feet. It's important to have manners when you are online."

Sysop City

WANNABE NETWORK ADMINISTRATORS may not be able to commandeer a mainframe during working hours to share info over Internet, but there are other options. Many online fans go on to start their own BBSs. The Arizona Macintosh Users Group tries to help by offering a CD ROM called BBS in a Box. This CD ROM offers many megabytes of shareware and public-domain files for \$50 for Macintosh users who love downloading files. Contact AMUG president Michael Bean (602/553-8966) for details.

Another source of downloadable files is the MacFiles Distribution Network, a group of Macintosh sysops that has established a FidoNet echo specifically for dis-

tributing shareware and public-domain Mac files. The network distributes 10 to 100 files every week. Contact Ralph Merritt via FidoNet at 2605/611 or Maria Langer at 2605/157 for more information.

Must Reads

SEVERAL BOOKS HELP USERS NAVIGATE Internet, which requires a guide for intelligent use. One very readable and highly praised volume is *The Whole Internet User's Guide & Catalog*, by Ed Krol, mentioned earlier. I have not seen the following two books, but others have recommended *Zen and the Art of the Internet: A Beginner's Guide*, by Brendon Kehoe (Prentice-Hall, 1992), and the more intermediate-level *The Matrix*, by John S. Quarterman (Digital Press, 1990). An excellent, more general guide to Internet, FidoNet, and much more is *The BMUG Guide to Bulletin Boards and Beyond* by Bernard Aboba, a BMUG sysop and knowledgeable denizen of the online world. (The second edition will be out in March. It should be available from Quantum Books [617/494-5042] in Cambridge, Massachusetts.)

Ultimately, the networks and BBSs you find useful depend on your needs and your personality. Like a city neighborhood, each online system has its own

Service Hero

David C. Falco of Farmingdale, New York, writes in praise of NewGen. His company wanted to buy a NewGen printer that supports 11-by-17-inch output, but the model wasn't available in time for the opening of Falco's new offices. NewGen came to the rescue by providing a loaner printer to use in the meantime. As a result, Falco wasn't "forced to buy a competitor's printer with a lesser feature set," he writes. "Not bad considering I haven't even made a deposit yet."

character and quirks. It may take several visits to navigate comfortably, so give yourself time to explore. No matter where you wander, you'll probably benefit from discovering 24-hour access to people and resources online that can help you compute and work more effectively. **m**

Send nominees for sainthood to Service Heroes, *Macworld*, 501 Second St., San Francisco, CA 94107, or via AppleLink (Macworld1) or America Online (Branscum). Conversely, drop *Conspicuous Consumer* a line if a company is ignoring you.

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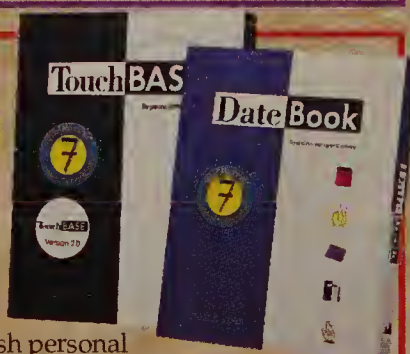
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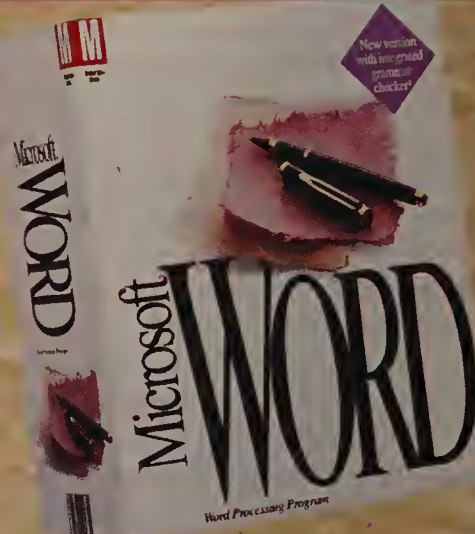
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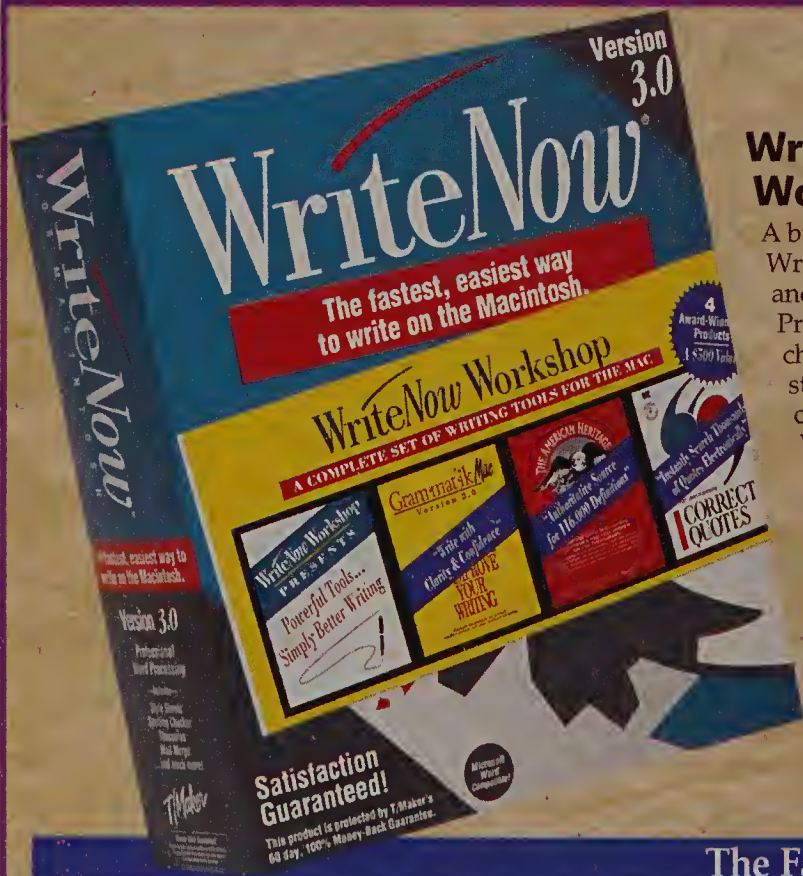
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- ✦ "Very Good Overall Value", MacWEEK, June, 1992 (version 3.0)

- ✦ Highest rating for Ease of Use, Speed, Value and Documentation, Government Computer News
- ✦ Highest overall rating, Software Digest, 1990
- ✦ Editors' Choice Award, Computer Reseller News, 1990

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Presentation Graphics Program

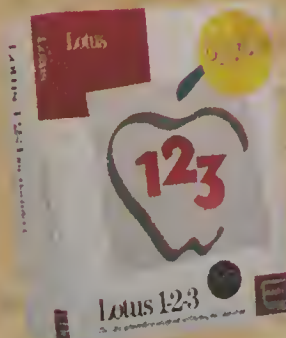
Microsoft PowerPoint 3.0 Competitive Upgrade

Now you don't have to rely on outside sources to produce slides and overheads for your presentations. Microsoft PowerPoint for the Macintosh allows you to make slides and overheads directly on your Mac! Upgrade now from a competing presentation graphics program (requires proof of ownership) and receive PowerPoint 3.0 for this enticing competitive upgrade price. Requires proof of ownership of a competing presentation software product. Microsoft #06300

01220 PowerPoint 3.0\$328
06299 PowerPoint 3.0 Upgrade Version Upgrade\$98

**COMPETITIVE
UPGRADE**

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Lotus 1-2-3 for the Mac Competitive Upgrade

Move up to the power of Lotus 1-2-3, designed exclusively for the Macintosh. Upgrade from a competing spreadsheet at this enticing upgrade price. Lotus 1-2-3 is powerful and easy to use. You'll find innovative spreadsheet capabilities that provide intuitive access to commonly used functions. To qualify simply send us the first page from the user manual of your competing spreadsheet software product. Lotus #00518

#00507 Lotus 1-2-3 1.1\$328

\$57

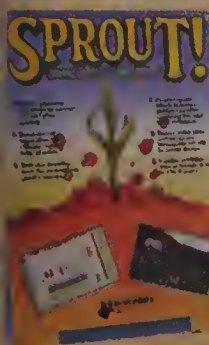
MacMoney 3.53

MacMoney is a full double-entry personal and small business bookkeeping system and financial planning tool. MacMoney tracks expenses, bank accounts, credit cards, assets, liabilities, cash and income. You can create up to 250 accounting categories and divide transactions among as many as 8 categories.

Survivor Software #01582 ✓



Design It Yourself with Abracadata...And Save!



Sprout!

\$42

Sprout! is a complete computer planning tool for vegetable gardeners. With it you can easily produce a graphic, scalable garden plan with correct plant and

row spacing. In addition, Sprout! contains a fully editable database of vegetables for 7 climate regions. Print out garden layouts, calendars, shopping lists and reports. Abracadata #05085

\$26

Mighty Draw

Mighty Draw is the affordable, general-purpose, object-oriented drawing program that lets you create pie charts, bar charts, flow charts, organizational charts, graphs, electronic schematics, network diagrams, fliers, newsletters, greeting cards, advertisements, logos, clip art and much more. It comes with its own unique symbols, and you can add symbols from other programs. Abracadata #06162



**YOUR
\$58
CHOICE**

Whether you are a professional or a do-it-yourselfer, the Design Your Own Home series can make your planning time more productive.

Each program includes sample plans and a try-out section to get you started, plus command cards to keep by your side as you work. There are 3 programs: **Architecture** takes you from floor plans to structural details. It lets you side view building plans and the overlay feature allows you to layer details such as electrical or plumbing schematics and multiple floors.

Interiors makes it easy to plan the decor of your home or office. Use the drawing tools and supplied patterns to bring your interiors to life! View any room from the top or from four different automatic side-view perspectives.

When you're ready to start planning the grounds, **Landscape** lets you see how it will look before you plow and plant. Use the built-in object library or draw your own trees, shrubs, etc., then automatically see your design from four different side-view perspectives. Prints plans and plant shopping lists. Abracadata ✓

#03609 Architecture • #03611 Interiors • #03610 Landscape



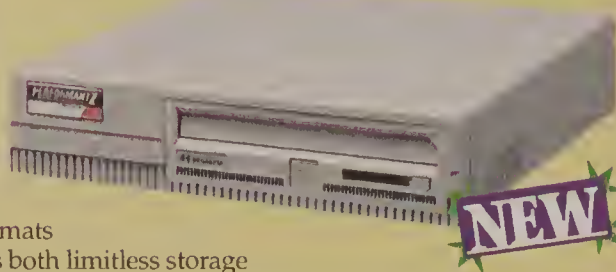
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Performantz 44/88MB Removable Drive

\$748

That's right, the Performantz 44/88 Removable Drive reads and writes both 44 and 88MB SyQuest cartridges. Finally, you can run both formats with one drive! It's perfect for anyone who needs both limitless storage potential and broad format compatibility. Performantz removable hard drives are engineered using the very same removable drive technology that has set the standard for removable hard drives. The only difference is that Performantz makes this technology affordable! Fast enough to be used as a second hard drive, it is ideal for backing up or removing your data for security purposes. Includes one 88MB SyQuest cartridge. Performantz #06539









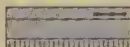
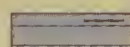
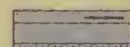
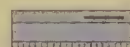
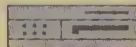

SyQuest **\$69** 44MB Removable Cartridges

With removable SyQuest cartridges your storage capacity is virtually limitless. Lifetime warranty. SyQuest #02183

#05442 Syquest 44 MB 5 Pk \$328
#05443 SyQuest 44 MB 10 Pk \$649
#00183 SyQuest 88 MB Single Pk \$106

#06214 Performantz 42MB Ext \$338
#06225 Performantz 80MB Ext \$438
#06215 Performantz 105MB Ext \$488
#06216 Performantz 210MB Ext \$688
#06217 Performantz 425MB Ext \$1388
#06218 Performantz 870MB Ext \$1788
#06221 Performantz 42MB Int \$258
#06222 Performantz 150MB Int \$368

#06223 Performantz 210MB Int \$598
#06329 Performantz 88MB Rem \$698
#06330 Performantz 210MB 44MB Rem \$498
#06492 Performantz Mac SE Int HD Mnting Kit \$19
#06226 Performantz Mac LC/Si Int Mnting Kit \$15
#06227 Performantz cx/ci/0700 Int Mnting Kit \$15
#06228 Performantz Mac II Int Mounting Kit \$20
#06229 Performantz Mac 0900/950 Int Mnting Kit \$29

Your Mac	To Upgrade to:		Purchase	Order QTY	Item #	Total
Plus / SE 1MB standard 	Plus/SE	2.5	Two 1MB SIMMs	1	05653	\$88
	Plus/SE	4	Four 1MB SIMMs	2	05653	\$176
Classic * with adapter 1MB standard 	Classic	2	One 1MB SIMM	1	03824	\$118
	Classic	4*	Two 1MB SIMMs	1	05653	\$88
Classic II, LC 2MB standard 	Classic II, LC	4	Two 1MB SIMMs	1	05653	\$88
	Classic II, LC	6	Two 2MB SIMMs	1	05655	\$168
	Classic II, LC	10	Two 4MB SIMMs	1	05656	\$336
SE/30 1MB standard 	SE/30	8	Eight 1MB SIMMs	4	05653	\$352
	SE/30	17	Four 4MB SIMMs	1	05654	\$672
	SE/30	32	Eight 4MB SIMMs	2	05654	\$1,344
Performa 200 4MB standard 	Performa 200	6	Two 2MB SIMMs	1	05655	\$168
	Performa 200	10	Two 4MB SIMMs	1	05656	\$336
Performa 400, LCII 4MB standard 	Performa 400/LC II	6	Two 1MB SIMMs	1	05653	\$88
	Performa 400/LC II	10	Two 4MB SIMMs	1	05656	\$336
Mac II, Mac IIfx 1MB standard 	II/IIfx	8	Eight 1MB SIMMs	4	05653	\$352
	II/IIfx	17	Four 4MB SIMMs	1	05819	\$698
	II/IIfx	32	Eight 4MB SIMMs	2	05819	\$1,396
Mac IIfx Mac IIfx 1MB standard 	IIfx/IIfx	8	Eight 1MB SIMMs	4	05653	\$352
	IIfx/IIfx	17	Four 4MB SIMMs	1	05654	\$672
	IIfx/IIfx	32	Eight 4MB SIMMs	2	05654	\$1,344
	IIfx/IIfx	64	Eight 8MB SIMMs	8	00848	\$2,704
	IIfx/IIfx	128	Eight 16MB SIMMs	8	06464	\$4,976
Mac IIsi 1MB standard 	IIsi	5	Four 1MB SIMMs	2	05653	\$176
	IIsi	9	Four 2MB SIMMs	2	05655	\$336
	IIsi	17	Four 4MB SIMMs	1	05654	\$672
	IIsi	33	Four 8MB SIMMs	4	00848	\$1,352
	IIsi	65	Four 16MB SIMMs	4	06464	\$2,488
Mac IIfx 4MB standard 	IIfx	8	Four 1MB SIMMs	1	05659	\$175
	IIfx	20	Four 4MB SIMMs	1	05660	\$672
	IIfx	32	Eight 4MB SIMMs	2	05660	\$1,344
	IIfx	128	Eight 16MB SIMMs	8	05129	\$4,976
IIfx, IIfx Performa 600 4MB standard 	IIfx/Performa 600	8	Four 1MB SIMMs	2	05653	\$176
	IIfx/Performa 600	12	Four 2MB SIMMs	2	05655	\$336
	IIfx/Performa 600	20	Four 4MB SIMMs	1	05654	\$672
	IIfx/Performa 600	36	Four 8MB SIMMs	4	00848	\$1,352
	IIfx/Performa 600	68	Four 16MB SIMMs	4	06464	\$2,488
Quadra 700,900,950 4MB standard 	Quadra 700	8	Four 1MB SIMMs	2	05653	\$176
	Quadra 700	20	Four 4MB SIMMs	1	05654	\$672
	Quadra 700	36	Four 8MB SIMMs	4	00848	\$1,352
	Quadra 700	68	Four 16MB SIMMs	4	06464	\$2,488
	Quadra 900/950	20	Four 4MB SIMMs	1	05654	\$672
	Quadra 900/950	52	Twelve 4MB SIMMs	3	05654	\$2,016
	Quadra 900/950	64	Sixteen 4MB SIMMs	4	05654	\$2,688
	Quadra 900/950	128	Sixteen 8MB SIMMs	16	00848	\$5,408
	Quadra 900/950	256	Sixteen 16MB SIMMs	16	00849	\$9,568

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TelePort Gold External Modem

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When you compete on the cutting edge, you need cutting edge technology. The TelePort Gold External Modem from Global Village is one of the highest performance Macintosh modems available. With an unsurpassed data transfer speed of 14.4 kbps and a top send/receive fax speed of 14.4 kbps, you'll have all the speed you need for intensive operations and dial-in network access. Comes complete with GlobalFax communication software. Global Village #06267



DataLink PowerBook Voice Modem

\$599

DataLink PB is powerful new technology for people on the move. It integrates the fastest data and fax modem available—14,400bps—for both data and send/receive fax—with complete telephone capabilities including two-way phone, speaker phone and digital answering machine. And it fits inside your PowerBook! Applied Engineering

#06511 DataLink PB for PowerBook 140, 145 and 170 \$599

#06513 DataLink PB for PowerBook 160, 180 \$599



Performantz 2400 Mini Modem

\$75

Have the world of online communications right at your fingertips without spending a lot of money! Discover what telecommunicating is all about! At such a great price, you can't afford not to check out the Performantz 2400 Mini, a fully featured 2400bps data modem in a mini-sized case. Performantz #06574

#06575 Performantz 24/96 S/R \$119

#06576 Performantz 14.4 S/R FX \$299



PowerMerge

\$84

Keep the files on your desktop Mac in sync with those on your PowerBook with PowerMerge. It identifies which computer has the most recent version of each file, updates the older versions with the newer ones and adds any new files and folders that have been created. Just select which files, folders or disks you want to update (or ignore), and PowerMerge does the updating for you automatically! It's fully System 6 and 7 compatible. Synchronizes any two Macs by direct link, network access or removable media. Leader Technologies #05690

PowerMerge: Special Features

- Precise**
PowerMerge gives you precise control over which files and folders will be maintained.
- Secure**
PowerMerge gives you the option to preview the updating process before it begins, so you remain in control.



ScanMaker II

\$928

Looking for an affordable, easy way to bring high quality graphic images into your Macintosh? You need the ScanMaker II Scanner from Microtek. It gives your publications the attention-grabbing power of a crisp color or black-and-white graphic and provide. It's the perfect desktop scanner for both the casual business user and the accomplished graphic arts professional. And it's available at a price that rivals today's leading gray-scale-only scanners. Microtek #06251

#06252 Scan Maker IIIXE \$1214



Uncle Milty's Clip Art Collection

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Use Uncle Milty's clip art and your newsletters, ads, fliers, invitations, brochures, memos, etc. will be more effective and inviting. It includes 100 high-resolution 300dpi illustrations on three disks. Use them with most popular page layout programs that import compressed TIFF. Works with Microsoft Word 5.0 and WordPerfect 2.1. Uncle Milty #04273



Aldus SuperPaint 3.5

\$134

Meet the all-around user's choice for outstanding graphics. And talk about versatility—start with the spontaneity of painting. Factor in the precision of drawing. Then top it all off with the capability to perform equally well on either black-and-white or color machines and you've got SuperPaint. The graphics solution for every situation. Aldus #04190

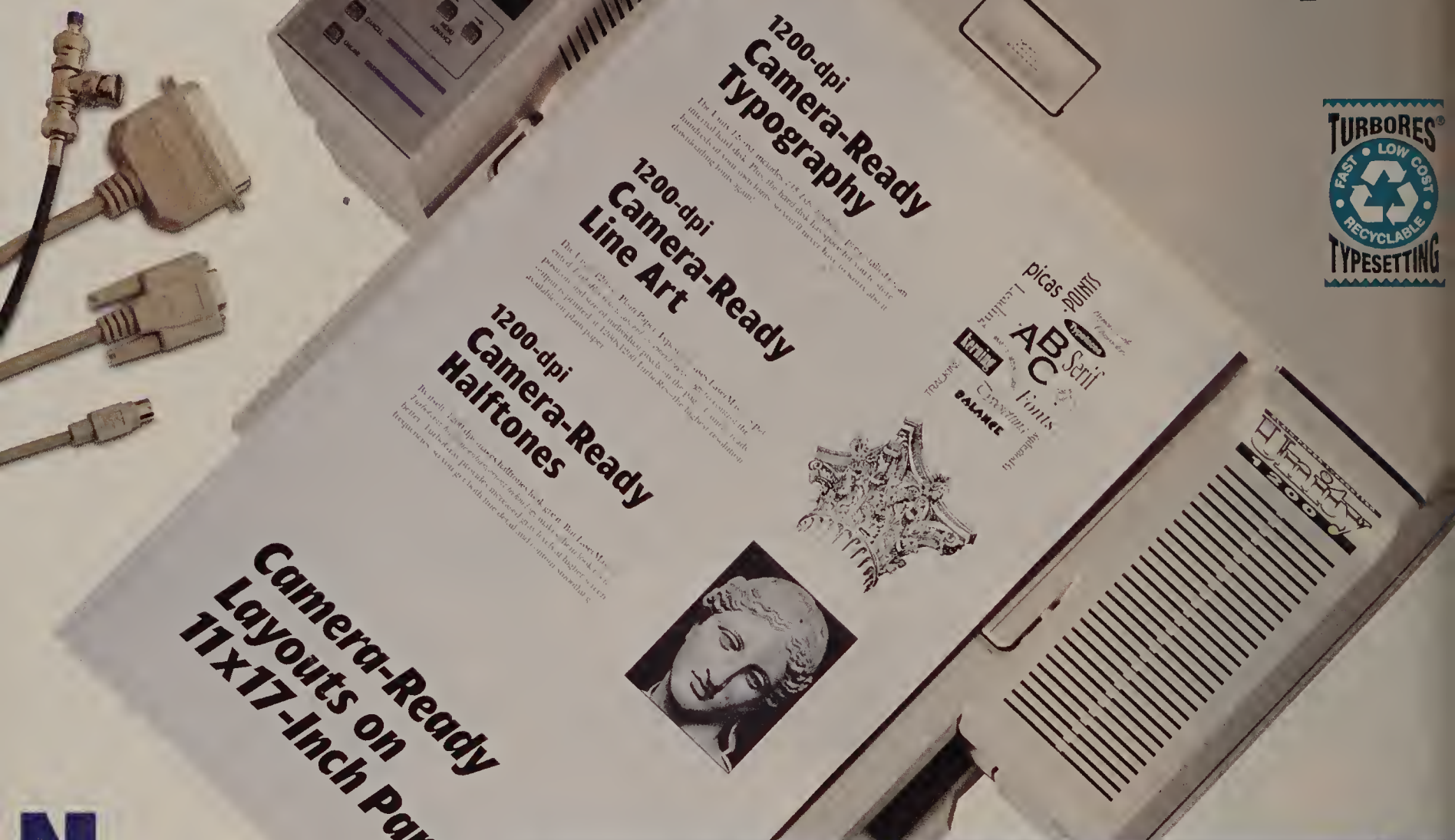
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- TurboGray™ halftone enhancement
- HotPorts™ automatic port switching for LocalTalk, parallel, serial, and Ethernet (optional) ports.
- SmartSense™ automatically switches between PostScript™ language and PCL
- Flexible paper handling up to 11x17-inch (A3) with up to 3 paper sources (optional)
- User-expandable RAM
- Software-upgradable controller



Unity 1200XL shown with optional paper trays.

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Circle 43 on reader service card

THIS MONTH:

Smart Network Hub • Apple's Budget Printers • Super-Mac Accelerators • WordPerfect Office Ups the Ante •

BY DAN LITTMAN AND TOM MORAN

Apple Unveils LaserWriter Selects

Apple recently introduced two of its most inexpensive laser printers with a host of new features designed to appeal to home users on a budget.

The LaserWriter Select 300 is a QuickDraw-based printer with a Fuji Xerox P0 5-ppm, 300-dpi engine. The Select 300 has all the features of the LaserWriter LS, which it replaces, plus

approximately \$250) provides the equivalent of 800-dpi printing with 90 shades of gray. Both GrayShare and PhotoGrade are compatible with Apple's Fine-Print edge-smoothing technology, which virtually eliminates jaggies on line art and text (the Select 300 comes with 39 TrueType fonts).

The LaserWriter Select 310 uses the same engine as the 300 but has Adobe PostScript Level 1 with 13 fonts. Sporting both serial and parallel ports, the Select 310 can connect to a single Mac (GrayShare is not an option) or PC running Microsoft Windows (the driver and manual come in every box). The Select 310 is powered by an AMD 29205 RISC

processor, and 4MB of RAM can be added to the standard 1.5MB for greater performance.

Pricing and availability were not final at press time, but the LaserWriter Select 300 was slated to ship February 10 at a list price of \$899, followed a month later by the \$1199 Select 310.—OWEN W. LINZMAYER.



ROBERT PERRY

THE APPLE LASERWRITER SELECT 300 IS A 5-PPM QUICKDRAW PRINTER THAT REPLACES THE LASERWRITER LS.

networkability and improved output quality.

The Select 300 relies on the host Macintosh for background rasterizing and can be shared on a network thanks to Apple's new GrayShare software, which also enables printing up to 33 levels of gray. For even better images, a PhotoGrade option (approx-



DOROTHY CARICO SMITH

NATURAL MATERIALS IN PAINTER 2.0. TOP: CHALK MIXED WITH WATER. BOTTOM: THE WATERCOLOR LOOK.

Fractal's New Painter

In a bid to offer an all-in-one graphic-design package in which you can create an impressionist-style painting and then do the color separations before the painting is printed, Fractal Design has added an enhanced interface and a wealth of new painting and image-editing tools to Painter 2.0.

New interface features include the ability to preview alterations to a design before applying them. You can also preview how a graphic will look when printed or output to

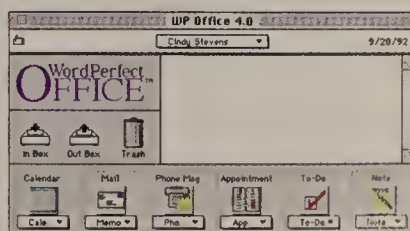
video, and for easy access, you can view thumbnails of graphics files before opening them.

New image-editing tools enable you to create masks easily; use a variety of lighting backdrops, such as a spotlight; and sharpen, soften, and resize photographs. Painter 2.0 is \$399; the upgrade cost is \$79. Fractal Design, 408/688-5300.—JAMES A. MARTIN

WordPerfect's Groupware

WordPerfect is combining the E-mail and calendar-management features of WordPerfect Office into one integrated system that will let colleagues coordinate projects and let managers delegate tasks, route messages to several recipients in order, schedule meetings, and manage to-do lists.

Office 4.0 will let users arrange their view of calendars, in-



WORDPERFECT OFFICE 4.0. USERS CAN RECONFIGURE THE OFFICE DESKTOP TO LOOK THE WAY THEY WANT IT TO.

INTEGRATING ANIMATION, SOUND AND VIDEO IS ONE THING. TAKING MULTIMEDIA WHERE IT'S NEVER BEEN BEFORE IS QUITE ANOTHER. YOU BETTER HAVE THE RIGHT TOOLS.

The limits of multimedia continue to be redefined by inspired developers everywhere.

A photojournalist and his production team publish an interactive book that chronicles a woman's camel journey across the Australian outback. A technology consultant develops a network of information kiosks for an urban convention center. An in-house producer assembles a high-impact presentation for an annual shareholders' meeting. And an electronic games designer creates a hit



The following well-known titles were created in Director:

- From Alice To Ocean
- Clinton: Portrait of Victory
- Total Distortion
- Victor Vector Series
- The Iron Helix
- Word Tales

- So You Want To Be A Rock and Roll Star
- Hell Cab
- Ocean Life
- It's A Bird's Life
- Xanthus
- Yearn 2 Learn, Peanuts Version
- Spaceship Warlock
- Rodney's Wonder-Window
- The Journeyman Project
- A Silly Noisy House
- The Virtual Variety Show
- MediaGraf Music Games
- The Virtual Portfolio
- Media Mix Interactive Magazine
- Your Heart
- The Multimedia Express
- Verbum Interactive
- EcoMasters

title that invites its users to battle a different intergalactic foe every time it's played.

The applications are as unique as the vision of each developer. Yet, they've all been produced with the very same tools you'll find in a program named Director®.

WELCOME TO THE DIRECTOR'S GUILD.

As the premier authoring software for multimedia productions, Director is the program-of-choice for more than 50,000 developers. In fact, virtually every best-selling multimedia

title and countless corporate presentations have been built in Director with the most advanced set of authoring tools ever created.

Those tools include a visual database for complete command of media content, a full-featured 24-bit paint module to generate graphics and animated effects, and an integrated timeline to sequence and synchronize your Director projects. Plus, the Lingo™ scripting language ensures total flexibility for creating links to external programs and adding interactivity to entire productions, separate objects or individual frames.

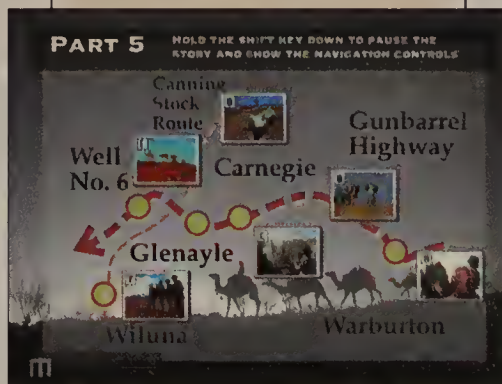
Only Director gives you the power to go as far as you ever want to go.

GO EVEN FARTHER WITH DIRECTOR 3.1.

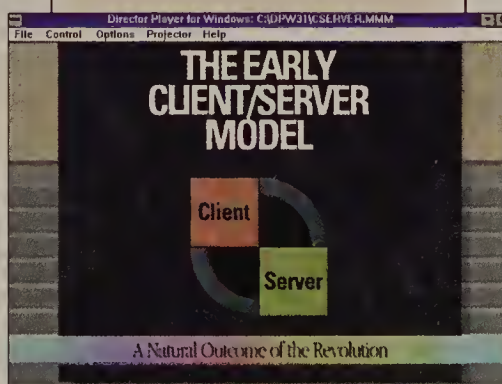
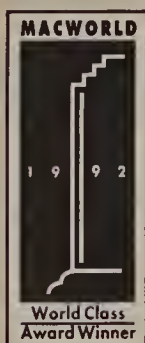
Our newest Macintosh® version of the industry standard adds exceptional QuickTime™ support, 23 robust Lingo commands and Macromedia™ Accelerator™ for compiling movies into faster playback formats.

While many programs import QuickTime movies, Director 3.1 gives you the tools to modify those movies or change them altogether. You can combine several movies into one, add controls for interactive playback and save your Director files as QuickTime movies for exporting to other applications.

MADE WITH
M
MACROMEDIA



Photojournalist Rick Smolan and Magnum Design utilized Director's extensive QuickTime functionality in developing an interactive CD-ROM disc for the best-selling book, "From Alice To Ocean."



Productions supporting full interactivity can be distributed with the Director Player for Macintosh (included with version 3.1) or the Director Player for Windows and the Director Player for IRIS workstations (available separately).

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After putting in all that time and effort, you'll want to share your productions with the largest possible audience.

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All of which could make a very big impression, indeed.

HOW DO YOU TAKE DIRECTION?

There's no telling how far you'll go with Director 3.1.

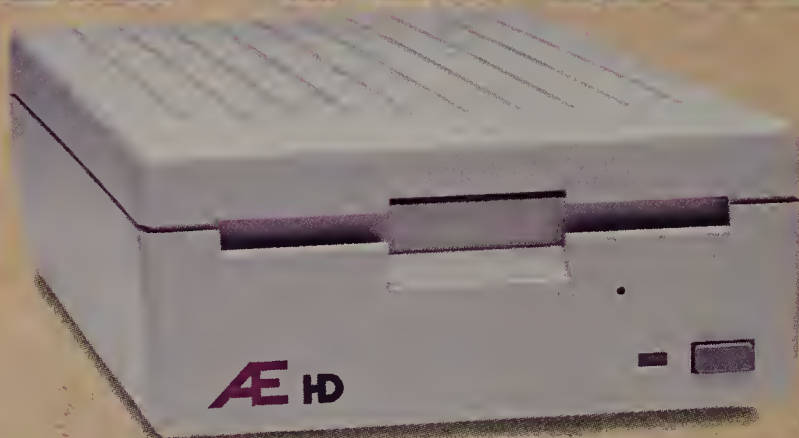
So call 1-800-945-9073 for more information and a copy of our \$9.95 multimedia production showcase video. (Outside the US and Canada, please fax 415-626-0554 or call 415-252-2000 and add \$15 [US] for shipping and handling.) Then you'll be on your way.

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Applied Engineering	Yes	Yes	Yes	Yes	2 Years	\$339
Apple	Yes	Yes	Yes	Yes	1 Year	\$399

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And our drive even offers something theirs doesn't: an exclusive 2-color read/write indicator that tells you exactly what your drive is doing at any moment.

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Circle 301 on reader service card

box, messages, and other Office components. It will have a utility for designing E-mail forms (later WordPerfect will release its high-end InForms package with links to WP Office). WP Office 4.0's Rules feature will support filtering messages by sender, content, and so on, and will then manage them in a user-defined way—for example, responding to all nonurgent mail with a boilerplate message.

WordPerfect says Mac client software will ship this spring, while server and administration software will ship for DOS first and may not be available for the Mac until early 1994. Office 4.0 will list for \$795 for a server and five clients; additional clients will range from \$80 to \$60 each, depending on quantity. WordPerfect, 801-225-5000.—D.L.



PAUL BERG

INSTRUMENTS NOT INCLUDED: VIVACE IS A TIRELESS ACCOMPANIST FOR MUSICIANS IN THE PRACTICE ROOM.

with software on cartridges to monitor the soloist's performance. Vivace can be hooked up to headphones or a stereo system.

Vivace can speed up and slow down to stay with the musician, or can play at a set tempo that makes the musician keep up with the other players. Vivace lists for \$2295, and cartridges start at \$30.

More Coda news: the company has acquired a technology that converts scanned sheet music into notation files that open in Coda's notation package, Finale. The company plans to market the technology in three ways: as an add-on to Finale, as a stand-alone product, and by setting up a service bureau. Coda Music Technology, 612/937-9611.—D.L.

Coda's Music Teacher

Coda Music Technology is expanding from music software to complete systems with a hardware-software combination designed to help budding musicians practice. Vivace, the Personal Accompanist, includes a microphone that attaches to the soloist's instrument; software that plays the accompaniment (by another musician, a band, a quartet, or an orchestra); and a MIDI device

TREND

Flopticals

Gain Acceptance

The high-capacity floppy drive from Insite Peripherals has picked up new support from key computer industry manufacturers and could conceivably replace the Apple SuperDrive in future Macintoshes. The 3.5-inch floptical disk holds 21MB and can also read and write in 1.44MB Macintosh and DOS floppy disk formats. To achieve such high data densities, the floptical drive uses a combination of optical-servo track positioning (the drive puts more tracks in the same space) and a special, high-energy magnetic floppy disk (the drive stores more bits within each track).

Silicon Graphics, which makes high-end graphics workstations, has announced that a floptical drive will be its standard floppy drive for the next generation of its products. Hewlett-Packard has also endorsed the floptical drive for its Apollo 9000 Series 700 workstations.

Floptical drives are currently available for Macs as external SCSI devices from PLI, Procom, Mass Microsystems, Applied Engineering, Iomega, and Liberty Systems. An Apple spokesperson said at press time that floptical technology is under evaluation, but would not

say if there are plans to incorporate floptical drives into future Apple CPUs.—TOM NEGRINO

J. SCOTT CAMPBELL

JUST FOR FUN

Funny Business

For all you newsletter literati who want to brighten up your publications without spending a fortune, Sandhill Arts has created the Funny Business Electronic Cartoon Library, a series of floppy disks containing cartoons by well-known artists. Each high-density disk holds 15 business-related cartoons in EPS format (which means they can be resized, but they will only print properly on a PostScript-compatible output device). With some legal restrictions, you can also customize the cartoons' captions (with your own name, for instance).

For \$49.95 per disk, you can reproduce the cartoons in slides, charts, brochures, in-house newsletters, direct-mail advertisements up to 50,000 pieces, and periodicals with fewer than 15,000 readers. A separate publisher's license can be negotiated with Sandhill Arts for larger periodicals and mailings. Regular subscribers to the library can receive \$17 off the price of each disk. Sandhill Arts, 415/854-0717.—T.M.



SuperMac's Thunder II Board, PhotoSpeed CD ROM

SuperMac has unveiled Thunder II, the next generation of its Thunder graphics accelerators, and PhotoSpeed, a subsystem that speeds Kodak's Photo CD digital photo-storage system and integrates it into a Mac graphics workstation.

Intended for high-end color publishing, the Thunder II series accelerates Photoshop, Photo CD, and EfiColor color management by up to 2300 percent, and accelerates QuickDraw by more than 2600 percent, SuperMac said. The \$9999

Thunder II HDTV board supports resolutions up to 1920 by 1040 at a 4:3 aspect ratio. SuperMac will also offer the \$4999 Thunder II, which has a 1360 by 1024 resolution, and \$3699 Thunder II Light, which has a 1152 by 870 resolution.

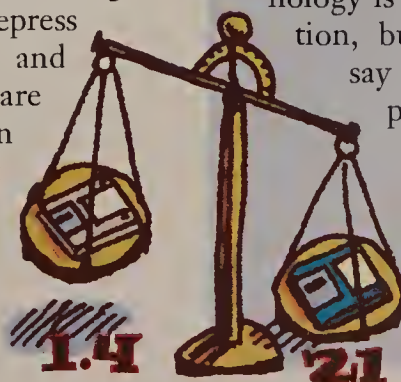
The PhotoSpeed subsystem includes a very fast multisession Toshiba Photo CD-compatible CD ROM drive and an image processing board with two DSP chips. The board comes with software for accelerating Kodak's Photo CD Access, Storm Technology's PicturePress image-compression software, and either Kodak's PhotoEdge or Adobe Photoshop. The hard-

Iomega Floptical Drive

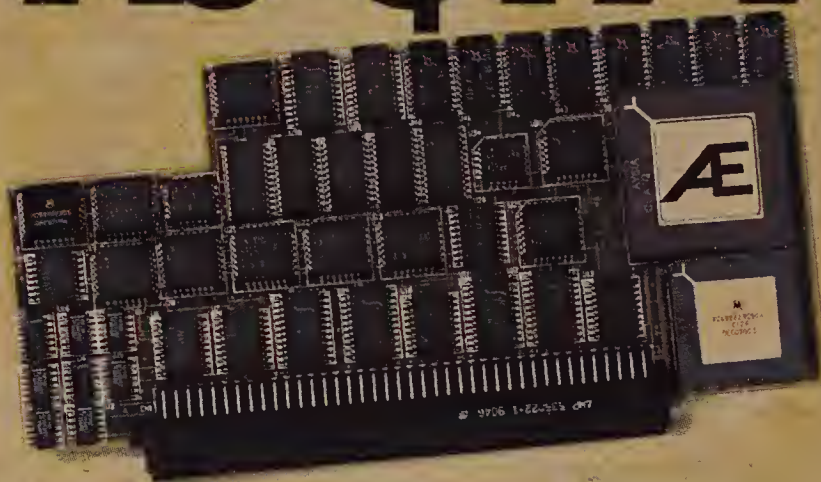
In a departure from its main line of removable-cartridge Bernoulli drives, Iomega Corporation has introduced a second-generation floptical disk drive. The Mac Floptical Subsystem drive uses the Holographic Optical Tracking (HOT) technique invented by Iomega to improve tracking and reliability.

Like other floptical drives, the Iomega device reads from and writes to regular floppy disks, as well as storing 21MB of data on floptical disks. Iomega began shipping the Mac Floptical Subsystem in January, at a street price that should range between \$399 and \$439. Iomega, 801/778-1000.—T.M.

ware and software together speed retouching and image manipulation by up to 2300 percent. SuperMac will also offer PhotoSpeed Pro, which will provide four times the performance of PhotoSpeed at higher resolutions for prepress use. PhotoSpeed and PhotoSpeed Pro are slated to ship in March, at list prices of \$2999 and \$4999, respectively. SuperMac, 408/245-2202.—T.M.



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Our new accelerators deliver all the speed theirs do. Plus a lot more features. At a much better price.

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Circle 167 on reader service card



Macromedia's high-end authoring tool Authorware Professional has been upgraded to version 2.0 with a hefty set of new tools for multimedia authors and \$3000 whacked off the price.

The new media manager saves space by allowing users to keep graphics, sounds, and



CURRENT VIRUSES, TROJAN HORSES, AND WORMS



TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 10/92
INFO: Initially discovered in a game called GoMoku
IMPACT: Both versions of T4 damage system files and applications



TYPE: Trojan Horse
FIRST LISTED IN VIRUS
WATCH: 10/92
INFO: ChinaTalk is an INIT that comes with a read-me file that claims it provides a female voice for MacinTalk
IMPACT: Deletes the contents of disk drive on restart

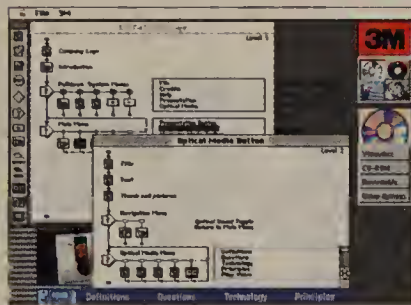


TYPE: Virus
FIRST LISTED IN VIRUS
WATCH: 8/92
INFO: Infects INITs;
becomes active only on
Friday the 13ths
IMPACT: Destroys files and
changes file and folder
names and attributes to
random garbage



TYPE: Virus
FIRST LISTED IN VIRUS
WATCH: 8/92
INFO: Displays a message
telling user it is destroying
contents of hard drive
IMPACT: After displaying
message, it deletes itself
without causing damage;
infected Macs may behave
erratically

other files in a library, where multiple Authorware applications can access them without creating copies. Authorware also has a new search-and-replace feature that lets authors



PROGRAMMING IN AUTHORWARE'S FLOWCHARTLIKE ENVIRONMENT AND, IN BACK, THE APPLICATION BEING CREATED.

Some typesetting tasks don't lend themselves to desktop publishing—for example, generating highly exact layouts, creating intricate tables, or composing pages of mathematical, chemical, and other scientific symbols. For tasks like that there are tools like Tex (pronounced *Tek*).

Tex began life as a control language for outputting equations on early electronic typesetting devices, and evolved into a precise and powerful typography programming language. The only Mac implementation of Tex, Blue Sky Research's Lightning Textures 1.5, stops far short of being a point-and-click interface, but it renders Tex code as users enter it so they can see what they've done in a separate window.

Lightning Textures is part of a \$695 package called Classic Textures that includes copious third-party documentation; LaTeX, a collection of macros for formatting scientific papers, books, and so on; other tools for creating bibliographies, indexes, and other special documents; and 75 PostScript math and symbol fonts. Blue Sky Research, 503/222-9571.—D.L.

$$\sum_{j=1}^3 T_j \int_0^1 \left\{ \frac{d\phi_j}{dt} + k\phi_j \right\} \phi_i dt = \int_0^1 k T_e \phi_i dt$$

[illegible]

TWO TRICKS FOR TEX: A COMPLEX EQUATION AND AN IMPRESSIVE LAYOUT GENERATED IN LIGHTNING TEXTURES.

search applications for text strings or icons.

Macromedia says that tighter code doubles the speed of printing and of decision loops (a kind of branching based on a user's response to a question).

Macromedia is also upgrading the Windows version of Authorware; files can be translated in either direction, though XCMDs and QuickTime don't make it across from Mac to Windows.

Authorware 2.0 lists for \$4995. Upgrades from version 1.7 are \$695. Macromedia, 415/252-2000.—CAROLYN BICKFORD

Network Resources Corporation (NRC) plans to update its software for managing hubs to control more than its own network devices.

Based on the Simple Network Management Protocol (SNMP—the nonpartisan standard for managing devices over a network), the \$995 Multi-Gate Manager SNMP controls and monitors NRC's Multi-Gate SNMP hubs over TCP/IP. NRC's new \$3495 24-port 10BaseT hub can be manipulated remotely using Telnet



JENNIFER CHEUNG

**WHILE WAITING FOR APPLETALK
SNMP, NRC IS PROVIDING
SNMP OVER TCP/IP
FOR ITS MULTIGATE HUBS.**

and can accept software upgrades downloaded to a new flash ROM.

What NRC first released as mild-mannered management software for its own hubs will soon be keeping tabs on most devices that have a TCP/IP SNMP Management Information Base. With third-party pager software, the new Multi-Gate Manager will be able to warn network managers of impending doom. Pricing for the new version was not set at press time.

SNMP does not run on AppleTalk yet, a situation that Apple will remedy later this year. NRC will add AppleTalk support then. Network Resources Corporation, 408/263-8100.—MARGIE WYLIE

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PLANNED GROWTH

To Matthew Long, it just didn't make sense.

His beloved hometown of Elfre, Maine, has had a severe housing shortage ever since the big pizza-sauce factory opened in nearby Biddeford.

Workers, who have done much to spur the local economy—are doubling even tripling up in small apartments. Some are even sleeping in cars.

Mr. Long, who happens to be a contractor, wants to help by building

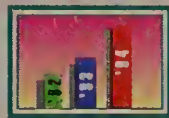


affordable new homes for these workers. Unfortunately, that's the last thing the Elfre Zoning Board wants to happen.

Elfre, they say, has enough houses. "We have to control our growth," says Barney Hutchins, longtime resident and councilman. "We don't need any more strangers than the ones we have now."

Mr. Long sees it differently. "I think it's pretty cheesy. Everyone was a stranger here at one time or another.

While the current recession has generally eased much of this country's growth problems, in any areas it has not abated at all. In Las Vegas, population increases



LAS VEGAS - Ever since gambling came to the desert town, people have, too. Between 1970 and

1970, its population almost doubled. By 1990, over a quarter-million people were calling it home.

If trends continue, say experts, Las Vegas will have a serious ones on its hands.



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Pixar's New Standard

Pixar's upcoming product, Glimpse, may make RenderMan as basic to 3-D graphics as PostScript is to publishing.

RenderMan is a tool for creating photo-realistic 3-D objects and environments by applying shaders, which can make bottles look like glass and cafés look smoky. But RenderMan has a problem, a problem that PostScript has transcended. PostScript Type 1 fonts

are accepted as a standard because they all work exactly the same, but RenderMan is not yet widely accepted because every RenderMan shader works differently. Any RenderMan-capable 3-D program needs a separate interface for each shader—no interface means no shader.

Enter Glimpse, the universal interface. It appears as a window inside any Glimpse-compatible 3-D modeler to provide control over a look (a new kind of shader), with slider bars for adjusting parameters. Glimpse provides quick feedback when you change parameters, and you can name and save modified looks for reuse.

So far VIDI has committed to supporting Glimpse in Presenter Professional; other 3-D vendors will follow suit. Pixar will also sell Glimpse for \$99 to use in Typestry and ShowPlace. Pixar, 510/236-4000.—D.L.

Glimpse!

A SOPHISTICATED RENDERMAN SHADER
MADE EASY TO USE AS A GLIMPSE LOOK.



J. SCOTT CAMPBELL

Software for Driving Disks

Third-party disk-formatting software may give better performance or provide features not provided in Apple's basic disk-formatting software or the software that comes with many third-party drives. Two companies are touting new drive software.

Surf City Software is shipping Lido 7, an all-purpose drive utility. Lido 7 supports most Macintosh drives, including most makes of removable cartridges, magneto-opticals, and floppicals (Lido 7 includes an INIT for mounting all kinds of removables). It can change the size of partitions after formatting and provides password protection for partitions. Lido 7 is \$95. Surf City, 714/289-8543.

Insignia Solutions says its RapidTrak adjusts the RAM cache depending on the type of application accessing the drive. RapidTrak also makes it possible to mount DOS-formatted removable media and access them with Apple's Macintosh-PC Exchange. RapidTrak is \$99.95. Insignia Solutions, 415/694-7600.—D.L.

040 Acceleration for Less

Mobius Technologies has announced its Speedster line of six 68040 accelerators, with prices starting at \$799. The boards fit into the processor direct slot (PDS) of the Mac IIci and Performa 600. With a \$49 adapter, the boards work with the Mac IIxi, SE/30, Mac II, IIx, IIcx, LC, and LC II. Three Speedster boards use the 68040 chip; they run at 25MHz (\$1099), 33MHz (\$1299), and 40MHz (\$1499). Three other Speedsters use the 68LC040 chip, which lacks built-in floating-point processing, at speeds of 25MHz (\$799), 33MHz (\$899), and 40MHz (\$999). Mobius Technologies, 510/654-0556.—TOM NEGRINO

Faster Printers for Workgroups

To avoid long lines of people waiting for laser printer output, busy offices are turning to printers that can crank out pages faster, thanks to faster print engines and processors.

The Olympus IS2030 300-dpi printer handles letter- or legal-size paper. The \$6995 printer is rated at 20 pages per minute and is based on an Intel RISC processor running TrueImage, Microsoft's PostScript-clone interpreter. The IS2030 also supports Hewlett-Packard's PCL 5 printer language and has simultaneously active LocalTalk, Centronics, and RS-232C serial interfaces. An optional Ethernet interface is available for \$1095. The IS2030 comes with two 250-sheet paper trays.

BGL Technology is shipping the LaserLeader 9215 (\$5995), a 15-ppm printer that is based on a Fuji Xerox engine. It prints at a resolution of 400 dpi on letter-, legal-, or tabloid-size paper. The high-speed printer comes with a 52MB internal

News

SCSI drive for font storage and uses Pipeline Associates' PowerPage PostScript emulation. The standard amount of RAM is 8MB, expandable to 32MB. Olympus Image Systems, 714/753-5935; BGL Technology, 805/987-7305.—TOM NEGRINO



SEAN SULLIVAN

THE BGL LASERLEADER 9215
IS A 400-DPI LASER
PRINTER THAT PRODUCES 15
PAGES A MINUTE.



BUG REPORT

WriteNow 3.0 Incompatible with Norton Utilities' Directory Assistance on Macs with 9-inch screens. T/Maker is shipping a modified version 3.0 that fixes the bug and is available free to registered users on request.

Version 3.0 files cannot be imported into QuarkXPress 3.1. T/Maker says it is currently developing the proper filter.

Luminator LCD Burns out the logic board of the venerable Mac Portable (problem does not affect PowerBooks). nView warns potential customers who inquire and says the risk is prominently documented with the units.

Mavis Beacon Teaches Typing 1.3 Doesn't work properly with Dvorak keyboard layout. Software Toolworks says it will notify registered users when a bug-fix is ready.

Performer 4.01 Save As command crashes and damages original file. Mark of the Unicorn says bug is fixed in 4.02, which was sent to registered users.

Infini-D 2.0 If an Infini-D file subscribes to an Adobe Illustrator file and the Illustrator file is moved, the Infini-D file becomes unopenable. Specular says bug is fixed in version 2.01, which was sent to registered users.

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"WITHOUT PROGRAPH, I MIGHT HAVE MISSED MY FLIGHT ON THE SPACE SHUTTLE."

"When NASA was planning a September 1992 launch of the Shuttle Endeavor, they asked us to



*Scott Pronych of
Dalhousie University
Halifax, Nova Scotia,
programmed with
Prograph.*

put a frog experiment on board. Actually they weren't frogs yet, just frog eggs, to be fertilized in space. NASA needed some answers about fertilizing vertebrates in microgravity and our job was to conduct a variety of tests on the tadpoles when they returned to earth.

Now, the equipment for this kind of experiment is not something

you run down to the nearest WalMart to buy. And neither is the software for the Macintosh, so we had to write our own. Hypercard was slow, its critical timing mechanisms were inaccurate, and C and C++ were intimidating. We chose Prograph from TGS Systems instead.

Prograph was perfect from the beginning. The graphical dataflow language of Prograph made it easy to use all of the best Macintosh features. It is faster and easier to use than THINK C, it has an interface builder that simplifies creation



*Eddy
Award
Winner
★★★★*

and management of windows and menus, and it allows complete access to the Macintosh toolbox. Using Prograph's automatic debugging capabilities, we moved effortlessly toward our launch date.

Now, Prograph is the first choice for all our custom applications. After all, space shuttles don't wait for slow programmers."



*"We heartily
recommend it to
in-house corporate
programmers..."
MacUser, October
1992*

 **TGS Systems**

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F O R S P E C I A L P R I C I N G

Circle 267 on reader service card

Prograph 2.5 is a trademark of TGS Systems. All other product names are the trademarks of their respective holders. ©1993 TGS Systems. 447 Battery Street, Suite 300, San Francisco, CA 94111.

Putting the Squeeze on Video

Because of how much data a video signal contains (each 24-bit video frame, when digitized, takes up about 1MB of disk space), no Mac, not even the Quadra 950, has been able to capture full-screen, full-motion video. That changed with the release of three QuickTime-compatible video digitizers with on-board JPEG compression chips.

SuperMac's \$5999 Digital Film board captures 30-frame-per-second video at 640 by 480, the size of Apple's Macintosh Color Display hi-res 14-inch monitor. The board works with NTSC, PAL, and S-video inputs; captures stereo audio; and has NTSC and PAL outputs for recording to videotape. The Digital Film board also serves as a 24-bit video adapter for monitors up to 17 inches, and incorporates SuperMac's Thunder graphics-acceleration technology.

RasterOps' \$1999 MoviePak piggyback board adds full-motion, 640-by-480 JPEG video compression to the company's 24-bit video capture-and-display boards. MoviePak supports NTSC, PAL, SECAM, and S-video inputs.



HOLLYWOOD BROADCAST DESIGNER HARRY MARKS USES THE SUPERMAC DIGITAL FILM BOARD.

Video output requires the \$699 Video Expander II.

Radius has announced the Digital Media Studio, which captures 24-bit full-motion video, at 640 by 480 up to 1152 by 870, in 8-bit color, and stereo audio. The \$3999 board has an external panel for audio and video connections and can output images to videotape in NTSC or PAL formats.

All three boards come with Adobe Premiere 2.0 video-editing software. Radius also includes VideoLake's VideoFusion special-effects package and three CD ROMs of audio and video clips. Digital Film and MoviePak are shipping now; Digital Media Studio is expected to ship late in the first quarter.—TOM NEGRINO

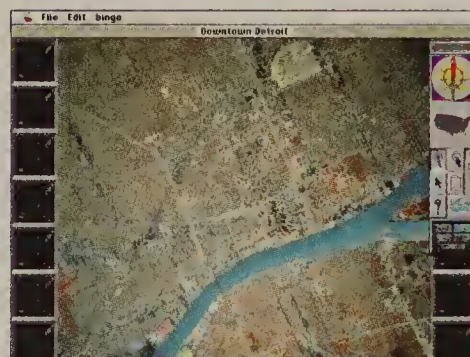
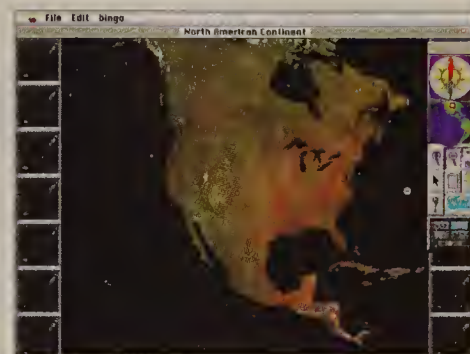
Views of the World

The United States has spent many billions of dollars gathering images of Earth from spy planes, satellites, and spacecraft, but unless you are a scientist, you've probably never seen more than a few of them. A new company called Now What Software has gathered about 250 images from NASA, the National Oceanic and Atmospheric Administration, the U.S. Geological Survey, and other organizations; processed them into Mac-compatible format; built an attractive interface for them; and pressed it all on a CD ROM called Small Blue Planet.

Small Blue Planet includes aerial photographs, false color infrared, and several kinds of digital multispectral images. From a CIA political map of the world, you can zoom in on aerial photos of major cities; geological maps of the earth's plates and ocean floor are also available. The CD includes information about how the images were created and how to obtain more files from the suppliers.

Small Blue Planet includes Chronosphere, a whimsical application that shows the changing line where day and night around the globe meet as the earth rotates each day and revolves around the sun.

All images on the CD are copyright-free. Small Blue Planet is \$199; Chronosphere is available on floppy disk for \$59. Now What, 415/885-1689.—D.L.



SMALL BLUE PLANET. TOP: CONTINENTAL MOSAIC OF NORTH AMERICA. BOTTOM: DETROIT FROM 40,000 FEET.



TURKEY SHOOT

DESIGN FLAWS NOTED

FileMaker Pro 2.0 Scenario: Say you have one or more FileMaker databases open. Say you try to open another file, but it's damaged. Say FileMaker tries to repair it but can't. Now what? Your only option is to quit FileMaker with your undamaged files open—and next time you try to open them, they'll be damaged too.

Microsoft Works 3.0 If you plan to make the switch from Works 2.0 to Works 3.0, be sure to set aside plenty of time to convert your old files, because you have to relaunch to convert each file. (Workaround for System 7 users: drag-and-drop launch the new Works with a bunch of old files.)

So you use Outline Selection to put a nice black border around a range of cells in your Works spreadsheet and it looks pretty cool. But then you decide to change your style, so you want to turn off the border. Isn't it odd that you must apply the border again before you can turn it off?

Macworld will send you a Turkey Shoot T-shirt if we shoot your turkey in this column. See *How to Contact Macworld*.

Compression Market Expands

Now Utilities is fielding Now Compress in the crowded market for software that saves room on a disk by automatically compressing files and decompressing them when they're needed. Two similar utilities are being upgraded.

Now Compress has a single window for performing all functions—selecting files to compress, creating archives, and so on. It can create self-extracting files; it can open files created by most competing utilities; and it has a viewer that lets you see the contents of an archive without decompressing it. Now Compress lists for \$99. Now Software, 503/274-2800.

Fifth Generation Systems is shipping AutoDoubler 2.0

(Salient Software, which developed AutoDoubler, was acquired by Fifth Generation). The new version can selectively compress applications and files in the System Folder and has a utility to speed Finder copying. AutoDoubler 2.0 lists for \$89.95. Fifth Generation, 504/291-7221.

Alysis is incorporating its automatic-compression utility, More Disk Space, into SuperDisk 2.0. The new version adds special compression for the resource fork of applications, can create compressed applications that don't require SuperDisk to run, and supports ETC's DataPress hardware-compression device. SuperDisk is \$119.95. Alysis, 415/566-2263.—D.L.

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If you think the deal's great wait until you see how great the printer is. This new 4-page-per-minute desktop laser printer comes ready to plug and play with Macintoshes[®] and PCs with simultaneously active ports. It also comes with Adobe[™] PostScript[™] Level 2 and PCL protocols, image enhancement for extra sharp copy and a single supply cartridge, too.

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Customer must submit coupon with proof of purchase (dated invoice and serial number) from an authorized distributor to Lisa Johnston, Digital Equipment Corporation, 6 Technology Park Drive, DSG2-2/C4, Westford, MA 01886-4197. FAX: #508-635-8141. One coupon per customer site. One printer per coupon. Offer valid for purchases and deliveries in the U.S. only. Printer must be purchased by 3/31/93. Coupon must be redeemed by 4/30/93. This offer cannot be combined with any other offer or discount.

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A SPLINE-LADEN IMAGE MODELED IN VIDI'S PRESENTER PROFESSIONAL 1.5 AND RENDERED WITH GLOSSY RAY-TRACING.

VIDI's New Presenter

Visual Information Development Inc. (VIDI) has released Version 1.5 of Presenter Professional, its 3-D modeling, rendering, and animation package. Presenter Pro provides spline-based modeling and vertex editing, and its rendering options include ray tracing.

Additions to the modeler include a Bevel Extrude command to extrude an object and bevel its surface at the same time; a Move To command for precise movement and placement of object groups; and the ability to export in StrataVision and ElectricImage formats. Presenter 1.5 also has better access to MacRenderMan shaders and textures, including support for RenderMan's Boolean operations, fog and other atmospheric shaders, and animated shaders for such effects as rippling water.

Presenter Pro has been reduced to \$2995. ModelerPro 1.5, which offers all of Presenter's modeling capabilities without rendering or animation, is \$1995. VIDI, 919/918-8834.—CARLOS DOMINGO MARTINEZ

Digital Ocean's Wireless Network

Ever wanted to network at the airport? If so, start-up company Digital Ocean has brought out Grouper, an AppleTalk-compatible radio transceiver designed for PowerBook users who want to create impromptu wireless networks or just add themselves to an existing AppleTalk LAN. The device, small enough to fit under a PowerBook, can talk to up to 14 other Grouper.

Each Grouper can use one of four communications channels so multiple "schools" of Grouper-equipped devices can coexist without interfering with each other. To link Grouper to a hardwired AppleTalk network, one Grouper must be directly connected to the network to act as a hub. A Grouper sends and receives data at 382 Kbps at distances up to 250 feet. The Grouper will list for less than \$500 and should be available in March. Digital Ocean, 913/338-1595.—T.M.

DESKTOP LIBRARIAN

Books on Microsoft Excel 4.0

This month we look over four companion books to Microsoft Excel 4.0.

- *Excel 4 for the Macintosh: Spreadsheet Strategies and Data Designs*, by Edward Jones (1992, \$24.95). Straightforward text aimed at beginner through intermediate levels. Reiterates material covered in the Excel manual. Includes tips in the margins. Useful "Command Reference" appendix. Osborne McGraw-Hill, 510/549-6600.
- *Microsoft Excel 4 Companion*, by Douglas Cobb and Judy Mynhier, with Mark Dodge, Craig Stinson, and Chris Kinata (1992, \$29.95). An 841-page book concentrating on 4.0's new features. Seven sections cover it all, from an introduction and the basics through advanced techniques using macros, Excel with other applications, charts, and databases. Microsoft Press, 206/882-8080.
- *Greg Harvey's Excel 4.0 for the Macintosh*, by Greg Harvey (1992, \$29.95). A good book for beginners to experts. Organized into two parts, Harvey's book covers everything from getting started with and building a spreadsheet to using macros, charts, databases, and graphics. Includes a chapter on troubleshooting the troublesome worksheet. Special tips, notes, and alerts throughout. Also provides appendixes of keyboard shortcuts and worksheet functions. Bantam Computer Books, 212/765-6500.
- *Macworld Guide to Microsoft Excel 4*, by David Maguiness (1992, \$22.95). Task-specific chapters consist of an overview, step-by-step instructions, quick tips, and summary. Includes a Quick Reference Card of keyboard shortcuts and financial formulas. IDG Books Worldwide, 415/312-0650.—SUZANNE COURTEAU



FOUR BOOKS THAT TAKE DIFFERENT APPROACHES TO EXPLAINING MICROSOFT EXCEL 4.0.

ROSEMARY WILTON

Scanning for the Paperless Office

After years of promises, the paperless workplace has never materialized and we continue to use paper at ever-increasing rates. Virginia Systems' new Sonar Image provides all the components needed to go paperless, so Macintosh offices may finally be able to start saving trees.

Sonar Image expands on Virginia's text-indexing and -retrieval product, Sonar Professional. Like Sonar Pro, Image can search text files at alarming rates, link concepts through hypertext, and perform context-sensitive searches. But Sonar Image adds image capture and archiving, and uses Caere's OmniPage Direct to provide optical character recognition as well.

Sonar Image links text with images of scanned paper files, so context items like margin notes and scribbled drawings are saved, and archives can incorporate files created in a wide variety of word processing and desktop publishing programs.

You need Sonar Image to create archives, but you can search Image archives with Sonar Professional. Sonar Pro is \$795; Sonar Image is \$2195; and one copy of Image with a five-pack of Sonar Pro is \$4936. Virginia Systems, 804/739-3200.—DANIEL W. RASMUS

News

Ten-ppm Laser Printers

Two versatile laser printers that produce up to 10 pages per minute are now shipping. NEC's Silentwriter 97 (\$2149) and Brother's HL-10PS (\$2395), both print at 300 dpi but use built-in smoothing technology for printouts that give the appearance of about twice that resolution. Both printers can also connect simultaneously to Macs and PCs—or even disparate networks—automatically switching to the correct printer port.

The Silentwriter 97, built around a Minolta marking engine, comes with Adobe PostScript Level 2, HP PCL 5 emulation, and 35 Type 1 scalable fonts. For an additional \$599, NEC sells an adapter for printing plain-paper copies of fax transmissions that have been prepared as PostScript files.

The HL-10PS contains a Brother marking engine, with the company's own PostScript Level 2 interpreter and 37 compatible fonts built in. It can also emulate HP's PCL 5 and comes with 36 fonts in that mode.

Both printers have room for 250 sheets per paper tray, with the ability to combine two trays for big jobs, but Brother's adds an adjustable tray that accommodates letter-size, legal-size, or A4 paper. Brother, 908/356-8880; NEC Technologies, 508/264-8000.—NANCY E. DUNN



RICHARD RETHMEYER

THE NEC SILENTWRITER 97 PRINTS 10 PPM AND CONNECTS TO MACS AND DOS MACHINES.

A TECHNOLOGY BREAKTHROUGH!

EXPAND YOUR DISK FOR TWICE THE SPACE.

SAFELY AND TRANSPARENTLY!

A 40Mb Drive Becomes An 80Mb Drive; An 80Mb Drive Becomes A 160Mb Drive!

AN ingenious new technology so advanced — it's patented. Transform your PowerBook or IIfx — with lots more storage. TimesTwo is amazingly easy to use — a one-time installation converts your disk to TWICE ITS ORIGINAL SIZE in just a few minutes — no additional configuration is required. And every bit of your information is 100% safe — TimesTwo does not alter data in its process. That's because — unlike anything we've ever seen — TimesTwo actually makes your disk bigger, instead of making your files smaller. Just drag a file from your TimesTwo disk to a floppy, another hard disk or AppleShare server and it arrives in its original form and same size. You can even take your TimesTwo disk to another Mac — and it remains twice its original size!

100% Compatible With Every Application. TimesTwo is a snap to install and works with all SCSI and SCSI-2 hard disks, including SyQuest removables, Bernoulli and erasable optical disks, and is fully compatible with all Macintosh applications, including file recovery programs like the Norton Utilities and Central Point's MacTools. A couple of mouse clicks installs the driver on the user's disk. After that, TimesTwo is completely invisible — there's no control panel, system extension or other system software installed on the disk. Go back to work, you're done.

And here's the kicker: TimesTwo is 100% transparent. The user doesn't even have to know it's there. TimesTwo works by compressing disk blocks at the driver level, reducing the amount of space they require, and increasing the true size of the disk. The Finder sees an 80Mb drive — the same drive it used to see as a 40Mb. TimesTwo intercepts files as The Finder requests to load them, and handles all compression and decompression BEFORE The Finder gets the data. To you, everything is normal, with absolutely no slowdown or extra steps — you're unaware of the TimesTwo activity. The only thing you notice is more room.

By operating at such a low level — lower than the level used by application programs — TimesTwo eliminates problems associated with changing files themselves. File icons, sizes and creator types remain the same as they would on a normal Mac, so files can be opened, saved, used, transferred, recognized and recovered just as they would on a normal Mac. You get twice the disk space without any of the problems associated with file compression.

Time-Tested For Reliability.

TimesTwo uses the same proven LZS compression technology used in Stacker, the industry-standard disk expansion product for the PC. That means — although TimesTwo's patent-pending technology is a new breakthrough for the Mac — you get years of tried-and-true experience for trouble-free, rock-solid service.

This is a PowerBook owner's dream! Instantly gives you twice the space — turn that 40Mb into an 80Mb without ever touching a screwdriver! Also eliminates the need for cumbersome external drives. For removable disks, media can be moved to another Mac without the need for TimesTwo on the receiving machine. For example, an 88Mb TimesTwo SyQuest cartridge that has been transformed into a 176Mb disk can be sent to a service bureau because the TimesTwo software is already installed on the disk.

Connecting to another Mac with AppleShare and copying files is easy. No file-size guesswork involved. Drag a file from another hard disk to your own — 100Kb there is 100Kb here.

TimesTwo is the trouble-free way to instantly double the size of any hard disk on any Mac.

It's A First — Nothing Else Like It.

TimesTwo is the first driver-level disk expansion product for the Mac. No one else has it.

TimesTwo isn't just new, it's a quantum leap beyond such products as AutoDoubler and More Disk Space. Those type of products increase disk storage by compressing individual files, changing creator types and inevitably causing numerous compatibility problems. (So you need to constantly buy upgrades from them.) But TimesTwo is different. TimesTwo works with rock bottom system levels so file sizes and creator types are not changed. That's why file and recovery programs like Norton Utilities and MacTools can go about their business diagnosing and fixing disk problems.

TimesTwo is especially attractive in an era when budgets and resources are tight. System administrators love TimesTwo because of its simple installation and complete transparency to the user. To administrators, adding another hard disk represents not only a significant expense, but also the added difficulty of proper configuration and the security risk posed by external disks. TimesTwo handles all that.

The Old Way: With products like Compact Pro, Stuffit and DiskDoubler, you have to manually select individual files for compression and decompression. Even with products like AutoDoubler that automatically compress and decompress files when they're loaded or saved, you're still working with individual files. You're adding a level of interaction (and complication) between the application program and the Mac operating system. That spells eventual trouble every time.

These type of programs were originally designed not for hard disks — but for modem file transfers. The original purpose was to save money by cutting modem transfer times — shrink the file size and transfer it faster. It was also developed for squeezing files onto floppy disks to save money when distributing applications and files. But it also became popular as a way to increase hard disk storage space.

Here's just some of the reasons why you don't want to do it the old way:

- Compression and decompression requires constant user intervention. It's just more work.
- Files must be decompressed before they can be recognized and used by an application.
- A decompression utility must be included with compressed files for others who don't own the compression product.
- Compressed file sizes don't represent the file's real, useable size. Users have to guess whether they have enough disk space to decompress and use it. (Automatic compression programs attempt to handle this by playing tricks with the Finder, but that makes them highly vulnerable to any new changes in the Mac's operating system.)
- You can't double-click on a file to launch the original

Twice the Space — Transparently!

Feature	Times Two	Auto Doubler	Disk Doubler
Expands Disk to Twice Original Size	■		
Compresses Files		■	■
No Configuration	■		
100% Transparent	■		
Works With All File Recovery Utilities	■		
Changes Icons and Creator Types		■	■
Installs Instantly	■		
Doesn't Require Decompression Utility	■		
100% AppleShare Compatible	■		

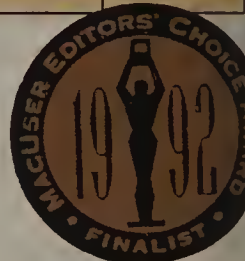
application; double-clicking launches the decompression program instead.

- Some compression programs replace the original icon with their own — then you can't tell at a glance what kind of file it is.
- In changing file creator types, compression can falsely trigger virus-detection software — who needs that?
- Compressed files can't be salvaged by file-recovery programs. (In other words, only perfect people who never make mistakes or have equipment can feel safe.)
- Compression programs can't compress the System Folder problems. That means if you have a 20Mb System Folder that's 10Mb you'll never get to use.
- Constant packing and unpacking of files play havoc with disk fragmentation, so your hard disk and overall performance slow down much more rapidly.

TimesTwo — The New Way: Rather than operating on files and placing extra layers of complexity between a program, its files, and the Mac operating system, TimesTwo goes right to the basics. TimesTwo gets down to the disk driver level and doubles the size of the disk. It compresses the disk storage blocks so twice as many fit on the same disk. It's that simple. As a result, the Finder, Mac operating system and all application programs see a disk that's twice as big. Files aren't compressed at all, creator types aren't changed, and users continue to work as they did before.

TimesTwo removes the complexity with:

- No file changes. No guessing about "real" file size to make sure you have enough room to work, and no different creator types that make a file useless to the original application.
- File recovery programs still see the same files they did before, so recovery is no problem.
- No extra level of file manipulation between an application and the Mac operating system. No chance of future incompatibilities if Apple changes things.
- No unpacking utility needed for distributing disks and files, because TimesTwo is already there — inherently on the disk. TimesTwo is the way to run a hard disk. Twice the space — Transparently!



TimesTwo



Twice the Space — Transparently!

1.44MB

For Macintosh



GOLDEN TRIANGLE

BDZ2868 TimesTwo \$99.90

New MacEKG Spots Trouble Before It Strikes!

The Mac used to be a simple machine. It was a 128K write-and-paint-wonderland, the system folder was just a boot-up utility and the applications were limited. It was a computer for the rest of us...

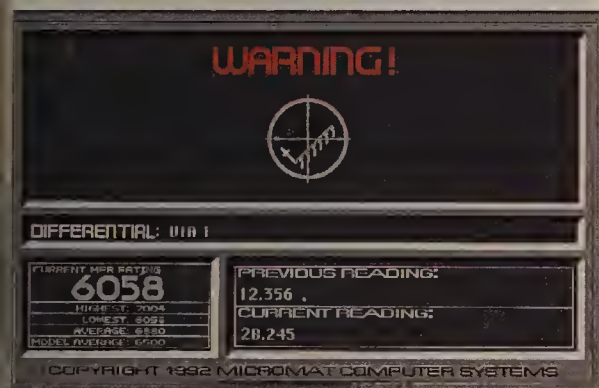
People who bought Macs way back when, circa 1984, paid more than they would have for a stodgy DOS machine, but they didn't mind — they knew the potential of the fun-loving box with the monitor built in and the cute little icons.

They were right. The Mac has grown up, becoming a powerful and mature business tool in its own right. Today, the Mac enjoys a starting role in a variety of businesses, from graphic designers, to CEOs to television producers. The Mac can run spreadsheets with the big boys, produce pro-quality type, 3-D animation and more.

With this amazing growth, the Mac now has some serious responsibilities. It must handle CDEVs, extensions, scanners, viruses, megabyte drives, virtual memory and voice recognition.

That means your Mac must be modified for the way you work — and what type of work you do. And that opens the door for possible problems. Drop an extension into your Mac's system folder and watch the fireworks!...

MacEKG is the most advanced, easiest-to-use system diagnostic program we've seen, helping you prevent problems before they even think about occurring. You can run a series of tests and get immediate, understandable results on what's going on and what's going wrong. MacEKG watches your system with a set of features that used to be available only to Authorized Apple technicians. Moreover, some of the routines included in MacEKG are not available anywhere else.



If EKG detects a substantial decrease in performance, it displays a warning and directs you to the offending part. This is precisely what any technician needs to know to repair a Mac.

Avoid Simple Conflicts And Lethal Failures! Apple has served up a tempting curveball with System 7. It's advantages fulfill many of the promises that the Mac made in the early days. But there's a funny spin, and if you use System 7, you know what we mean.

Let MacEKG handle the technical stuff. It quickly learns your system and performs a carload of tests — everything from logic performance, RAM stability, software compatibility, inventory control, video processing, integrated circuit integrity, media verification and overall system health. It analyzes what it finds and provides you with a "dashboard" of your system, with helpful suggestions on how to improve performance while eliminating the possibility of intermittent system failure.

It can also tell you how to squeeze every bit of performance out of your Mac. For example, did you know that a Mac Plus can outrun a Mac II? It can if the Mac II is loaded with extensions arranged inefficiently. The Mac Plus contains an accelerator and lean system folder. Try it and see...

You'll learn how INITs can degrade your system's performance by up to 2% per extension, and if you're running 3 or 4 of them...well, it adds up.

MacEKG knows about performance vs. function. It knows the difference between a hardware problem and a software problem. Often, a seemingly unsolvable problem is hidden in some unusual or whiz-bang code in a program, although it shows signs of being a hardware problem. MacEKG could tell you in a second.

Another great MacEKG feature is its ability to "road test" RAM before you actually unleash it on your system. MacEKG is like having a highly trained technician on a diskette. Although you won't need to know the inner workings of your Mac to get the most from it, you'll find yourself becoming a Mac expert in just a few short sessions. MacEKG is a must for the Mac user who wants a trouble-free, high performance system.

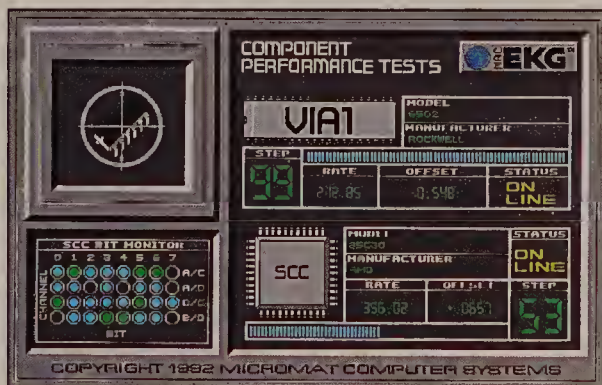


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Logic Testing. The first investigation conducted by MacEKG is a logic test. Eight high-level mathematical formulas are performed — MacEKG measures the time it takes to complete them. These math tests check the system's logic which is critical in running your applications properly: direct floating point addition, subtraction and multiplication, if/then loops, trigonometric functions, proportional floating point math, array indexing and square root loop. It sounds complex, but these functions are what make your Mac function — from word processing to high-end graphics. MacEKG makes sure the logic is true; if not, it alerts you to the problem.



MacEKG tests individual hardware components to seek out possible faults — before they become major problems. The VIA (Versatile Interface Adaptor) chips handle all user input like the mouse and keyboard. If allowed to get worse, a faulty VIA can cause complete system shutdown.

RAM Testing. With more complex applications, comes the need for upgrading your RAM. MacEKG tests each bit of RAM twice to verify that all bits of memory are useable. The test is more reliable than the Mac's self-test.

MacEKG registers and samples bits of memory, divides memory into eight blocks and runs each block through a battery of performance tests. If a block tests lower than the others, a "POOR" indicator will appear next to the suspect block and a component warning will be issued. You will see the actual chip that is bad — or about to go bad. MacEKG also tests your system's use of Virtual Memory (if you're running it) and report its performance in the diagnostic report.

PRAM Testing. PRAM (Parameter RAM) provides your Mac with time and date functions and acts as a storage area for keyboard and mouse settings, startup drive, port settings and more. PRAM, like main RAM, must always have power to hold the information it contains. MacEKG tests this chip with time and loading exercises —

Got an intermittent problem?

For intermittent failures, you need to run Reactivator. It continually tests, powers down and retests until the problem surfaces. This is a heaven-sent tool for anyone trying to find heat-related problems. (A must for every Mac technician.)

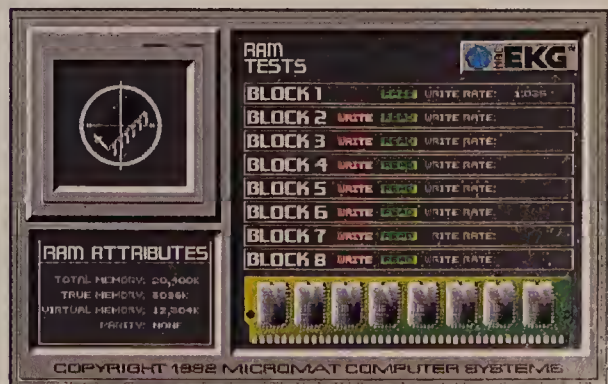


repeated 25 times — with times compared. More than 5% difference in these tests issues a "POOR" flag and a component warning is reported at the completion of the diagnostics.

VIA Testing. The VIA (Versatile Interface Adapter) handles your input devices like mouse and keyboard. It also helps in the operation of floppy drives. If there is a faulty VIA, you may experience a number of problems like choppy cursor movement or complete failure of the mouse and keyboard. It can also cause unpredictable and untraceable "freeze" crashes. In extreme cases, it can prevent the Mac from booting and displaying the "Sad Mac" message. MacEKG performs a complete, 100-step test to verify the VIA's accuracy.

SCC Testing. The SCC (Serial Communications Controller) circuit is essential for proper operation of modems, printers and other input/output devices. If your SCC is bad, you'll experience problems in serial communications or floppy drives that only get worse. The SCC test is a 100-step investigation that is updated on the MacEKG screen. This test can be accurately conducted even if a modem is connected to your SCC port.

SCSI Testing. The SCSI chip handles your Mac's high-speed parallel communications for both internal and external devices. These external drives, CD-ROM and other instruments rely on SCSI for smooth operation. Signs of a faulty or inoperable SCSI are poor or repetitive SCSI read/writes or complete inability to communicate with SCSI devices. This chip is often damaged by plugging a damaged cable or device into the port. MacEKG tests the SCSI chip and its individual channels for specific performance and displays the results of its 100-step test on your screen.



RAM is vitally important to the speed of your applications. Not only does MacEKG check that your RAM works, it checks the rate of its performance — then compares it to previous tests. If your RAM is getting slower over time, you know to replace it before it's too late.

MacEKG
BDZ2920 MacEKG . . . \$99.90

America's Most Popular Macintosh Workshops Now On Video

Speed Learning

Most people are amazed. They need training. They hate reading manuals and they don't want to pay huge sums for local Macintosh training. At first they feel like giving up in frustration. Then someone tells them about MacAcademy's unique and valuable Video Training Library.

The Price

The first benefit of the training library is the price. Each video is only \$49. While other training companies have raised their prices out of sight, MacAcademy videos cost the same as five years ago.

Selection

The next bit of good news is the huge selection of training videos available from MacAcademy. Below you will find a sampling of the videos currently available.

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No blurry screens. No paid actors reading scripts. No frills. Each MacAcademy video features one of our top trainers recreating the classroom atmosphere and teaching you each program from start to finish.

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Many of our customers say our videos cut their learning curve by up to 70%! Videos give you the ability to actually *see* each technique on the Macintosh screen. The video allows you to replay, to fast-forward, or to find any particular technique immediately by using our unique counter system.

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MacAcademy is the winner of the 1992 **MACWORLD World Class Award**. Readers chose MacAcademy as the top trainer in the nation. No other organization even came close! When it comes to training, MacAcademy has the best reputation in the business. You deserve World Class training at an extremely low price. In addition, all videos carry a complete 30 day guarantee.



30 Day Money - Back Guarantee. If you're not totally satisfied simply send the videos back for a full refund.

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☐ Adobe Photoshop Video #3
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☐ Aldus Freehand Video #2
☐ Aldus Freehand Video #3
☐ Aldus PageMaker Video #1
☐ Aldus PageMaker Video #2
☐ Aldus PageMaker Video #3
☐ Aldus PageMaker Video #4
☐ Aldus Persuasion Video #1
☐ Aldus Persuasion Video #2
☐ Aldus SuperPaint Video #1
☐ Aldus SuperPaint Video #2
☐ Aldus SuperPaint Video #3

☐ Claris FileMaker Pro Video #1
☐ Claris FileMaker Pro Video #2
☐ Claris FileMaker Pro Video #3
☐ Claris MacDraw Pro Video #1
☐ Claris MacDraw Pro Video #2
☐ Claris MacProject II Video #1
☐ Claris MacProject II Video #2
☐ Claris MacProject II Video #3
☐ Claris MacWrite II Video #1
☐ Claris MacWrite II Video #2
☐ ClarisWorks Video #1
☐ ClarisWorks Video #2
☐ ClarisWorks Video #3
☐ ClarisWorks Video #4
☐ Deneba Canvas Video #1
☐ Deneba Canvas Video #2
☐ Deneba Canvas Video #3
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☐ Claris HyperCard Video #2
☐ Claris HyperCard Video #3
☐ Intuit Quicken Video #1
☐ Intuit Quicken Video #2

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☐ Lotus 1-2-3 Video #2
☐ Lotus 1-2-3 Video #3
☐ Macintosh (6.0 or 7.0) Video #1
☐ Macintosh (6.0 or 7.0) Video #2
☐ Macintosh (6.0 or 7.0) Video #3
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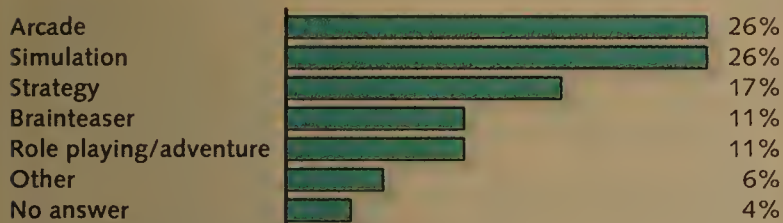
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Circle 106 on reader service card

Survey: Entertainment

What type of entertainment software do you most prefer?



Based on 448 respondents to a 1992 Macworld News survey who use entertainment software on a Macintosh. Figures do not add up to 100 percent due to rounding.

Color Matching by Agfa

Agfa has introduced two color-matching programs. FotoTune (\$795, \$495 until March 31, 1993) creates a profile of how your scanner or monitor produces its range of colors and then compensates for the colors your output device can't produce. FotoTune's color definitions help accurately translate colors from one device to another. The second release of the software package, expected in mid-1993, will also be able to dynamically define colors for output devices; until then the program uses predefined tags for printers and other output devices. The companion product, FotoReference, serves as an

absolute color reference with calibrated measurements of standard color swatches developed by the Commission Internationale de l'Eclairage (CIE). FotoReference comes in two versions, one for \$1110 that has spectral measurements for all the CIE IT8.7/1 and IT8.7/2 swatches, and one for \$295 that contains averages instead. Both programs are compatible with Apple's ColorSync. Agfa Division, Miles Inc., 508/658-5600.—NANCY E. DUNN

Sonic Gateway to TCP/IP

Sonic Systems has come out with two inexpensive software gateways that enable Macs and other LocalTalk devices to access TCP/IP services located on Ethernet networks. The first program, called PowerBridge/TCP, supports one Macintosh over LocalTalk. The second, called SuperBridge/TCP, supports five Macs over LocalTalk. Although both software bridges require a host Mac, the amount of processing power required is small enough that the host can still be used for normal work, according to the company.

PowerBridge/TCP retails for \$249 and SuperBridge/TCP for \$349; both are much less expensive than a hardware bridge. The software bridges are available now. Sonic Systems, 408/736-1900.—T.M.



THE MACINSTOR SPEED ARRAY WIDE USES SCSI-2 WIDE DRIVES AND A DATA CANNON ADAPTER BOARD.

SEAN SULLIVAN

TREND

Faster SCSI Drives

To the old saw that you can't be too rich or too thin, add the computer corollary: your hard drive can't be fast enough. If you have deep pockets, now several hard drive manufacturers can give you more speed. By implementing the SCSI-2 Fast and Wide standards, these companies promise a major improvement in hard drive data throughput.

By combining NuBus or PDS-based SCSI-2 adapter boards and a new generation of large, fast hard drives, sustained data-transfer rates of as much as 6.5 megabits per second can be achieved. By contrast, the built-in SCSI port on a Mac IIci tops out at a sustained rate of about 1.8 Mbps. In quick bursts, SCSI Wide or Fast performance can be even better; because Wide SCSI supports a 16-bit data path (regular SCSI is 8-bit), Wide SCSI systems can hit speeds of up to 16 Mbps. Fast SCSI can burst at up to 9 Mbps.

Storage Dimensions offers the Data Cannon PDS/Quadra Wide SCSI adapter board (\$1499) and MacinStor Wide hard drives in capacities of 2.8GB (\$12,124) and 5.6GB (\$23,599). Vendors shipping Fast SCSI systems with NuBus SCSI adapters and fast drives include Storage Dimensions (408/954-0710), Mass Microsystems (408/522-1200), FWB (415/474-8055), Microtech International (203/468-6223), and MicroNet Technology (714/837-6033).—TOM NEGRINO

Smart to the Core

At a base price of \$1299, the AsantéHub 1012 is an intelligent 10BaseT Ethernet hub that accommodates 12 RJ-45 ports, as well as a 3-in-1 port that can be used to interconnect multiple hubs with a backbone cable. This port has BNC, RJ-45, and AUI connectors for coaxial, twisted-pair, and thick-net wiring systems, respectively. The hub also has an RS-232C serial port that allows network managers to manage up to 12 hubs via modem. An optional SNMP plug-in module is available for \$399.

Companion hub-management software called AsantéView provides a graphical interface for network-performance indicators. The manager can control hubs and ports, identifying network bottlenecks and optimizing port usage. AsantéView provides network statistics and mapping. Mac and Windows versions of AsantéView are available, with price depending on configuration. Asanté, 408/435-8388.—TOM NEGRINO

News

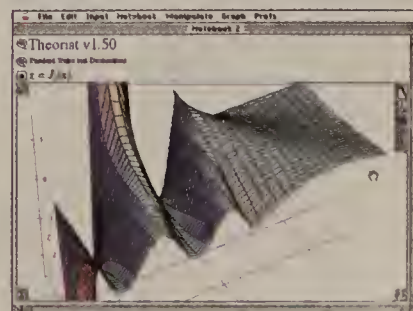
Theorist Turns the Tables

If you need to do mathematics on the Mac, you may appreciate Prescience's Theorist, an algebra processor that is about as true to the Mac's what-you-see-is-what-you-get model as a math program can be.

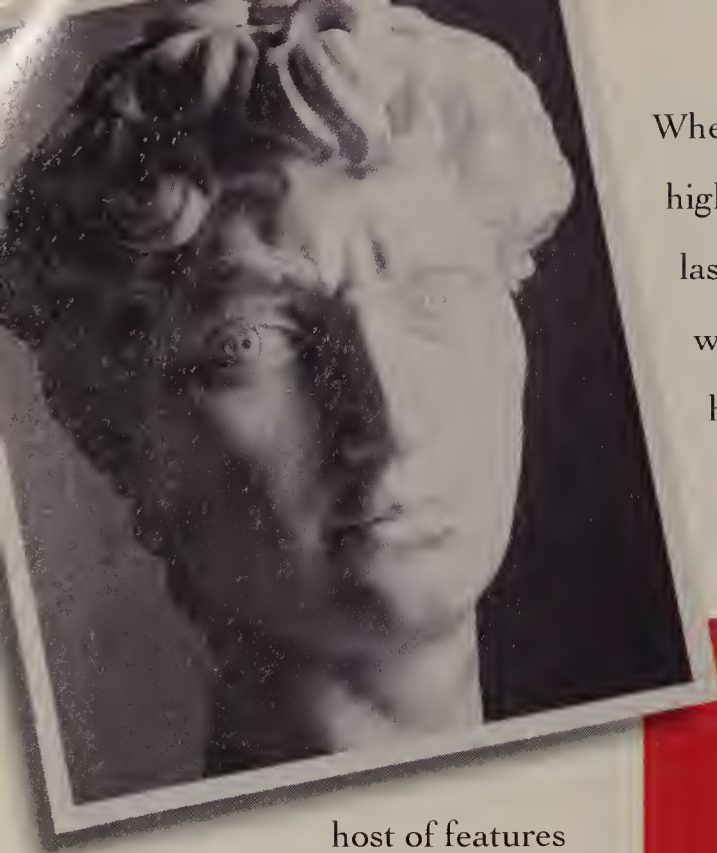
In a major upgrade, version 1.5, Theorist adds a decidedly numeric component to its symbolic nature. Raw numbers appear in tables (storing figures in an arraylike structure when manipulating raw data is more appropriate than using an equation). Theorist can generate values between defined points in a table by applying cubic interpolation based on the equation's slope and curvature and can also perform Fourier transforms on a table's values. The new version adds Bessel function support and can save a sequence of graphs as a QuickTime movie.

Version 1.5's new graphing tools include scatterplots, improved logarithmic plots, parametric 3-D graphs, and implicit graphs—graphs in which plotted values are indirectly derived from other values in an equation.

Version 1.5 supports an Apple-event suite for displaying graphs in other applications and can print using TrueType and PostScript fonts. Theorist 1.5 lists for \$449.95. Prescience, 415/543-2252.—D.L.



AN APPARENTLY SIMPLE EQUATION IN THEORIST 1.5 GENERATES THIS COMPLEX THREE-DIMENSIONAL SURFACE PLOT.



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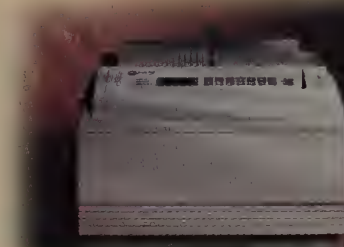
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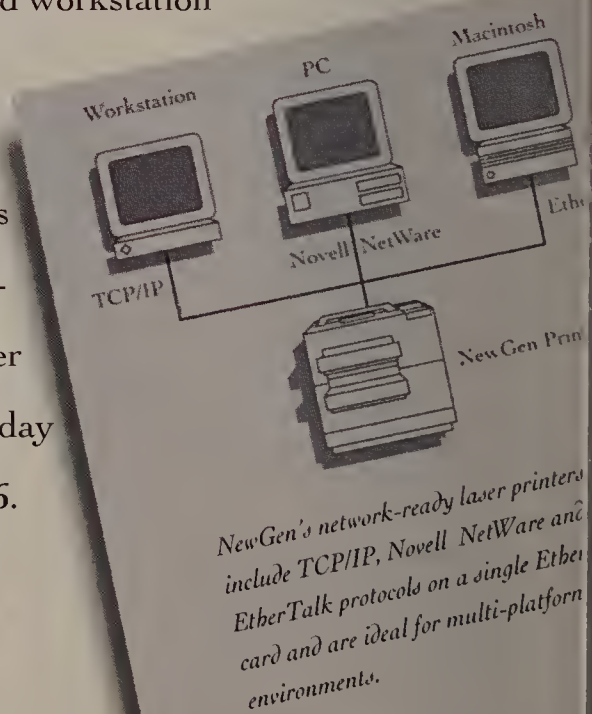


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* Introductory offer on Ultima Home Office for PowerBook ends March 31, 1993.

Circle 237 on reader service card

COLOR CLASSIC

Apple adds color to its original compact Mac, but is it worth the money?

*Compact Mac fans can wave
good-bye to black-and-white:
the Color Classic is here. And
besides its color display, the Color
Classic has PDS and FPU slots,
a built-in microphone, and a
logic board design that makes it
easy to upgrade. But notice how
close the Color Classic's prices are
to the more flexible LC models
before you get carried away with
its cute design.*

THESE DAYS, THERE ARE SO MANY MAC-intosh variations—LC, Performa, Centris, Quadra, two kinds of PowerBooks—and so many Macs with abbreviated life spans (remember the Quadra 900?) that it's a comfort to know the original Mac is still with us. Just as San Francisco has its cable cars, Central Park its horse-drawn carriages, and Venice its gondolas, we've still got that cute, huggable, luggable, all-in-one computer.

To prevent its signature Mac from becoming just an endearing anachronism, Apple has introduced the Color Classic, which updates the Classic II's 9-inch black-and-white monitor with a 10-inch built-in color display. Apple didn't stop there, though: the Color Classic also offers slots for a Processor Direct Slot (PDS) expansion board and a floating-point unit (FPU) math coprocessor, among other new features. Along the way, Apple gave the Classic a new look. (The Color Classic will be sold to international markets; at press time, Apple hadn't decided if a Performa version of it will be sold in retail outlets.)

Despite the emotional responses the Classic line arouses—nostalgia for the early days of the Mac and all that—the Color Classic poses a nagging practical question. Specifically, does it make sense to buy one? For starters, a 10-inch color screen is too small for anyone who's even halfway serious about desktop publishing,

B Y J A M E S A . M A R T I N



graphics, or multimedia. More important, the price of a Color Classic—at \$1389 for a 4MB RAM/80MB hard drive configuration—is only a few hundred dollars less than what you'd pay for a similarly configured LC II and a 14-inch color display (see "Classic Comparisons"). And when you consider that the Color Classic—with its 16MHz 68030 processor, 16-bit data bus, single PDS slot, and standard 256K of video RAM (VRAM)—is essentially the same computer as the LC II, it gives you reason to wonder.

Beyond Black-and-White

ALTHOUGH THE COLOR CLASSIC HAS A number of intriguing new features, the most important is, not surprisingly, the color monitor.

Color is not really new to compact Macs. The SE/30's ROM, for example, is the same as the Macintosh II's and includes support for color and gray-scale graphics. Third-party add-in monitor boards, such as the TX SE/30 from E-Machines, enable you to hook up a color display to the SE/30.

In October 1991, the Classic II replaced the Classic; part of that upgrade was an improved ROM with 32-bit QuickDraw, which technically gives the Classic II the ability to display gray-scale and color information. However, because the Classic II's built-in display is 1-bit black-and-white, and the computer offers no expansion slot, adding color is not a smooth operation. Among the third-party products for adding color to a Classic II are Radius's PowerView and Aura Systems' Scuzzy View, external display interfaces that let you hook up a color monitor to a Classic II (or a PowerBook without video-out capability) through the SCSI port. But SCSI devices have rarely, if ever, been lauded for their speed, and this type of workaround is often frustratingly slow.

As long as the Classic II had the capability to display color, why didn't Apple offer a Color Classic earlier? According to Apple, the quality—and price—of smaller color displays just wasn't viable until now. In addition, the Classic's chassis and logic board needed to be redesigned to accommodate a color-display tube. When Apple introduced the Classic II, it just wanted to get a 68030 replacement for the 68000-based Classic out the door as quickly as possible.

The Color Classic's Sony Trinitron 10-inch display (measured diagonally) is remarkably crisp and offers 12 percent more viewing area than the Classic II's 9-inch screen. With 512 horizontal by 384 vertical pixels, the Color Classic's resolution is the same as that of the now-defunct Apple Macintosh 12-inch RGB Display. Nonetheless, the 10-inch monitor looks much sharper because it displays the same number of pixels across a smaller area.

In fact, the Color Classic's 10-inch Trinitron display has an overall screen resolution of 76-dpi, while the 12-inch screen has a 64-dpi resolution (which looks watered down in comparison) and the 14-inch Macintosh Color Display has a 70-dpi resolution.

For your further statistical enlightenment, it's worth mentioning that the 10-inch Trinitron picture tube's clarity is measured at .26mm stripe pitch. The most important thing to know here is that the smaller the stripe pitch, the sharper the image. By comparison, the 12-inch color display has a .28mm stripe pitch, while the 14-inch Trinitron's stripe pitch is also .26mm.

Like the LC II, the Color Classic ships with 256K of VRAM for displaying 8-bit color (256 colors). With the addition of an optional 256K VRAM chip (\$99), the monitor will display 16-bit color, or 32,768 colors. Using the Color

Squaring Off: New versus Old

The Color Classic resembles the Classic II and previous compact Macs, but there are noticeable differences—among them a tilted, oversize front; front-bezel volume and screen-contrast buttons; a built-in microphone; and feet on which the computer stands.

The Color Classic's modified appearance prompted a variety of responses from *Macworld* editors. Here's a sampling.



ADRIAN MELLO, *editor-in-chief*: "The most disturbing design change is the broad protruding bezel that houses the color monitor. It reminds me of the armored collar plate around a triceratops head. The whole design looks like a baby dinosaur that just erupted from an egg. The new look is growing on me, but part of me regrets the partial loss of the original Mac design."

TOM MORAN, *associate editor/news*: "It looks like the Alamo, or some adobe structure. It really doesn't look that much like the original compact Mac, but people will like the color screen and the slide-out logic board for easy upgrading."

CHERYL ENGLAND, *senior editor/features*: "When I first saw the Color Classic, I had the same feeling you get when you see a basset hound puppy trip over his ears. I wanted to smile, then I felt a little bit guilty—how could I betray the faithful old design? But when I found out it has an LC II-style expansion slot, I started to take this baby Mac seriously."

JAMES A. MARTIN, *senior associate editor/features*: "In general, I'm happy to see that Apple is keeping the original compact Mac design, despite the alterations. But the Color Classic has those same design-for-design's-sake 'airholes' as the Mac IIvx and Centris models. The lower-front-panel adornment serves no practical purpose and looks as if the designer responsible was unduly impressed by acoustical tile ceilings at an early age."

TIM WARNER, *assistant editor/lab*: "A neoclassical, postmodern Italian design with deconstructivist tendencies . . . but it grows on you."

CHARLES PILLER, *senior associate editor/features*: "It's a welcome design change. The old Classic and all old compact Macs remind me of the VW bug—but let's hope the new design doesn't do the same thing to Apple that dropping the bug did to Volkswagen."

GALEN GRUMAN, *associate editor/features*: "It's sort of baroque looking, and I don't like it. In particular, the huge bezel makes the monitor look tinier than it really is."

MARK HURLOW, *associate editor/lab*: "I find it slightly overweight and oversized. Also, the screen is kind of small—a 640-by-480 screen would certainly have been an improvement. The contrast and sound control buttons are a nice touch, but I could live without them."

The Color Classic's small display size makes absolutely no sense for anyone who needs to regularly view or edit large color files. So why not buy an LC II instead?

Classic's PDS expansion slot—which is compatible with the LC slot—you can add a graphics board for 24-bit color. The Color Classic's built-in video supports only the 10-inch Trinitron screen; if you want to hook up an external display, you need to add a board that supports that particular monitor.

Of course, the PDS slot opens up the Color Classic to many other options as well, including sending video out to a large TV monitor (with an NTSC video board)—great for teachers who want to show what's on the screen to a classroom of students; adding an Apple IIe emulation board, which enables you to run Apple IIe software on the Color Classic; adding a third-party CPU accelerator board; and installing Ethernet networking capability.

Room for a View?

BECAUSE THE 10-INCH MONITOR HAS the same pixel-by-pixel resolution as the 12-inch display, any software that runs on a standard 512-by-384-pixel display runs on the smaller display as well. Admittedly the image is smaller, but at least it's intact and not distorted.

With software designed to run on larger monitors, however, you could face some problems. Certain games and CD ROM titles, for example, need a 640-by-480-pixel display (such as Apple's 14-inch Macintosh Color Display) to work properly. These programs still run on a 512-by-384-pixel screen, but you can't see everything that's happening, and you lose access to any icons or controls that don't appear on the screen.

The Color Classic's petite viewing area can present a problem for anyone working with large graphics. You have to scroll color graphics that are larger than the screen to view the entire image. The higher the graphic's resolution, the larger the file size; and the larger the file size, the longer it takes the screen to redraw the image after each scroll.

As a result, the Color Classic's screen size makes absolutely no sense for anyone

who must regularly view or edit color files that don't fit in the display's viewing area or that are larger than 1MB or so. That leaves out a lot of images, including high-resolution Photo CD-formatted files (for more on screen-refresh rates, see "Color Classic Performance"). Of course, you could add an external color monitor for easier viewing, but that brings us right back to that nagging question: Why not just buy an LC II instead?

To strike a more positive note, the Color Classic works fine for viewing QuickTime movies. The computer ships with QuickTime 1.5, which enables you to comfortably view video clips in a 320-by-240-pixel window (QuickTime 1.0

could only manage a 160-by-120-pixel viewing area).

If you plan to look at QuickTime clips regularly, add the extra VRAM for 16-bit color for best results; QuickTime clips look pretty ragged with just 8-bit color.

Performance Notes

IN GENERAL, MACWORLD LAB TESTS didn't reveal any significant performance differences between the Color Classic (with no FPU), the LC II, and the Classic II.

With display-intensive tasks—Microsoft Word scrolls and the like—the Classic II was faster than the LC II and Color Classic. That's because the process of displaying text and graphics in black-

CLASSIC COMPARISONS				
	Classic II/ Performa 200	Color Classic	LC II/ Performa 400	LC III
GENERAL				
Processor	16MHz 68030	16MHz 68030	16MHz 68030	25MHz 68030
Math coprocessor	NA	optional	NA	optional
Data bus	16-bit	16-bit	16-bit	32-bit
Expansion slot	none	1 PDS	1 PDS	1 PDS
Height (in inches)	13.2	14.5	16 *	16 *
Width (in inches)	9.7	9.9	13.5 *	13.5 *
Depth (in inches)	11.2	12.6	16 *	16 *
Weight (in pounds)	17	23	32.8	32.8
Monitor	9-inch black-and-white (built-in)	10-inch color (built-in)	supports 12-inch monochrome; 12-, 13-, 14-inch color	supports 12-inch monochrome; 12-, 13-, 14-, 16-inch color; 15-inch portrait
Standard colors	NA	256	16 † ‡	256 † §
Maximum colors ††	NA	32,768	256 † #	32,768 † §
Ports and connectors	ADB; 2 serial; SCSI; sound in; sound out; floppy connector	2 ADB; 2 serial; SCSI; sound in; sound out	ADB; 2 serial; SCSI; sound in; sound out; video out	ADB; 2 serial; SCSI; sound in; sound out; video out
RETAIL PRICES **				
80MB hard drive	\$1079	\$1389	\$1768 ††	\$1948 ††

* The total space dimensions for the LC II and LC III combine CPU chassis dimensions with those of a 14-inch Macintosh Color Display. † On 13- and 14-inch monitors. ‡ Supports 256 colors on 12-inch monitors. § Supports 32,768 colors on 12-inch monitors and 256 colors on 16-inch color monitors. †† With additional VRAM. * Supports 32,768 colors on 12-inch monitors. ** Prices are for Macs with a standard minimum of 4MB of RAM. †† Suggested retail prices for the LC II and LC III include \$599 for the 14-inch Macintosh Color Display.

Inside the New Classic



The microphone circuitry, shown here, supports the new Classic's built-in microphone, which is located on the computer's front panel.

The deflection portion of the Classic's color picture tube is technically called a saddle yoke for low magnetic radiation. The yoke's coils are positioned as closely as possible to the display portion of the tube to reduce the amount of energy used and thus lower the ELF/VLF emissions that the yoke generates.

LC PDS slot

3 1/2-inch hard drive

The computer's feet give it some height and place the monitor in a slightly better position for viewing. But their real purpose is to give the Classic a distinctive new look.

The analog board contains two independent power supplies: one for the display, the other for the CPU. Power supplies are traditionally located on the main logic board, but here the goal was to design a logic board that could easily—and safely—be removed by owners.

The speaker is housed within a specially designed plastic box. The box is secured to the computer's chassis using a high-quality, Velcro-like material (generically known as a hook-and-loop fastener), which reduces sound vibrations.

The logic board slides in and out of the computer chassis along tracks.

1.4MB SuperDrive

The case holds the fan (not shown). This is mounted with rubber to minimize sounds and vibrations.

One glance at the new Classic and you'll see that it isn't the same old box it used to be; not as obvious is the new slide-out logic-board design, complete with PDS slot

and-white requires less data than displaying them in color.

The Color Classic performed slightly better than the LC II in display tasks. Again, the slight differences in performance are mostly because it takes a little longer to render data on a 640-by-480-pixel, 13-inch color monitor (our test display for the LC II) than on the Color Classic's 512-by-384-pixel, 10-inch color display.

New Color, New Look

AS LONG AS APPLE HAD TO TWEAK THE Classic's chassis and logic board, its designers went ahead and made a few other changes, too.

Beginning at the top of the chassis, Apple has added a built-in microphone for 8-bit mono sound input (the Classic II came with an external microphone for 8-bit mono sound input; the Classic shipped with no sound-input capability at all). The microphone is centered directly above the monitor, which may seem backward from a practical standpoint, as most people I know have eyes located above their mouth.

During its development, the Color Classic's built-in microphone picked up ambient noise from the computer's internal fan and vibrations from the hard drive. Apple engineers tried to fix this problem by installing the fan with a rubber mount, which acts as a shock absorber. Apple also cushioned the external microphone with rubber, to further prevent it from picking up vibrations. In addition, Apple recessed the microphone slightly into the front bezel, as a way to block ambient noise and better isolate voice input.

For comparative purposes, we made voice recordings on both the Color Classic and a Macintosh IIvx (using an external microphone). The Color Classic recording sounded as if it had been made while on an airplane in flight; it carried an audible background hum that wasn't present in the IIvx recording, even though actual background noise levels during both recordings were minimal. Granted, you aren't going to use your Color Clas-

sic to record CD-quality sound, but that hum was noticeable, persistent, and ultimately annoying.

Below the monitor Apple has placed four control buttons: volume up, volume down, higher contrast, and lower contrast. The external volume controls enable you to make the same kind of adjustments that you can make with the Sound control panel, but it's faster to

push the buttons. (By the way, you can also control the Color Classic's sound level and turn the computer on and off using the new Apple Adjustable Keyboard; for more on the keyboard, see "Apple Redesigns Input Devices" in *News, Macworld*, March 1993.)

The two display buttons under the monitor allow you to adjust contrast (the monitor's range of shades and colors). If you want to adjust brightness (the volume of light that's fed into the monitor), Apple has added a Screen control panel that enables you to adjust both brightness and contrast (see "Adjusting Your Vision"). In addition, the panel includes a useful Screen Power Saver, which, when activated, puts the monitor to sleep after a preselected amount of idle time (between 15 and 60 minutes). This feature prolongs the life of the picture tube, by automatically turning it off when it's not needed, and reduces the amount of power the Color Classic needs to operate (and thus lowers electricity bills ever so slightly). According to Apple, the Screen Power Saver reduces the power consumed by the screen from 60 watts when active to 30w when asleep.

Clicking on the mouse reactivates the screen. Depending how long it has been snoozing, the screen takes up to 15 seconds to spring back to life.

Other Cosmetic Changes

THE COLOR CLASSIC IS NOTICEABLY taller, deeper, and heavier than its compact Mac predecessors.

The front bezel now extends beyond the chassis—a result of adding the 10-inch color screen—and subsequently looks a bit out of proportion with the rest of the computer. Unlike that of its ancestors, the Color Classic's front tilts backwards 6 degrees, offering a slightly improved viewing angle on the monitor.

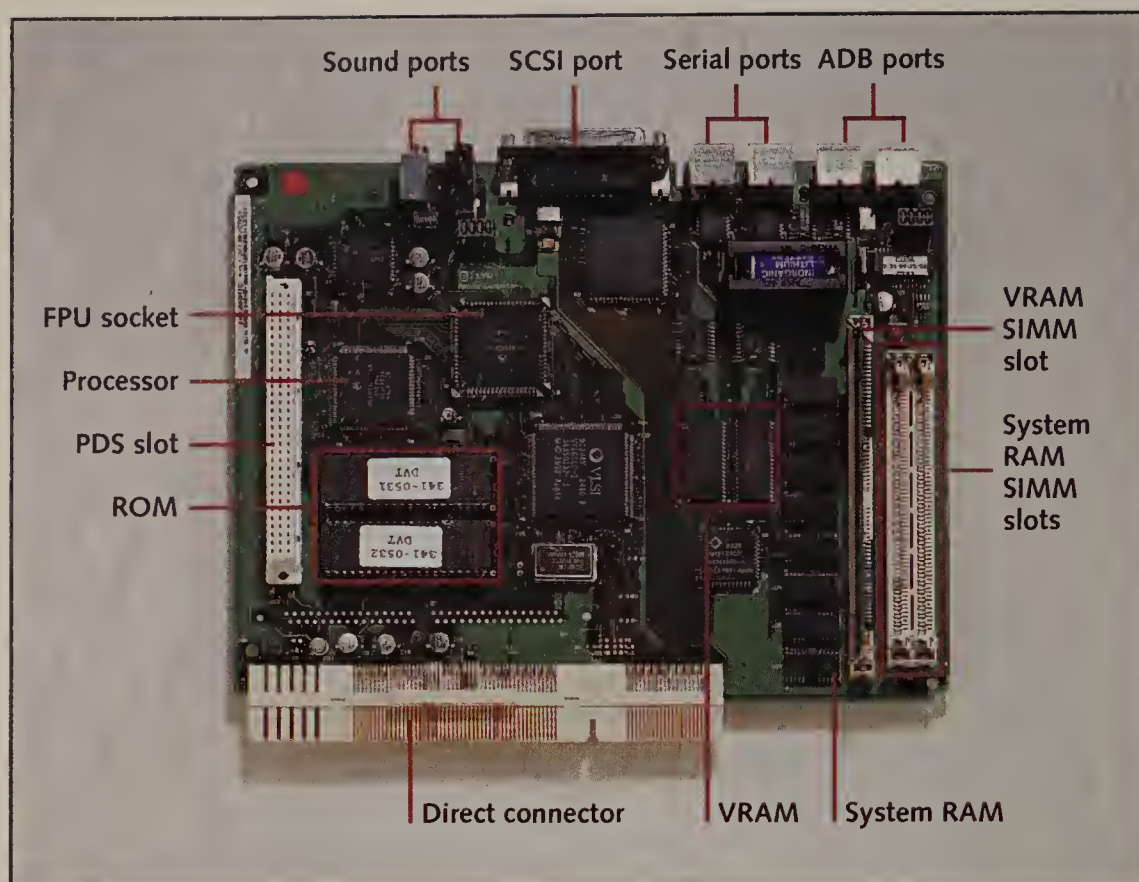
The Color Classic sits atop four built-in feet, which position the display a little higher than it would otherwise be (see "Squaring Off: New versus Old" for reactions to the design changes).



In Control The Color Classic has four control buttons for adjusting sound and screen contrast.



Snap and Slide The logic board's design makes it easy to pop the board in and out.



More on Board You can pull the logic board out to add an LC PDS expansion board. The logic board's direct connector secures the board back in place.

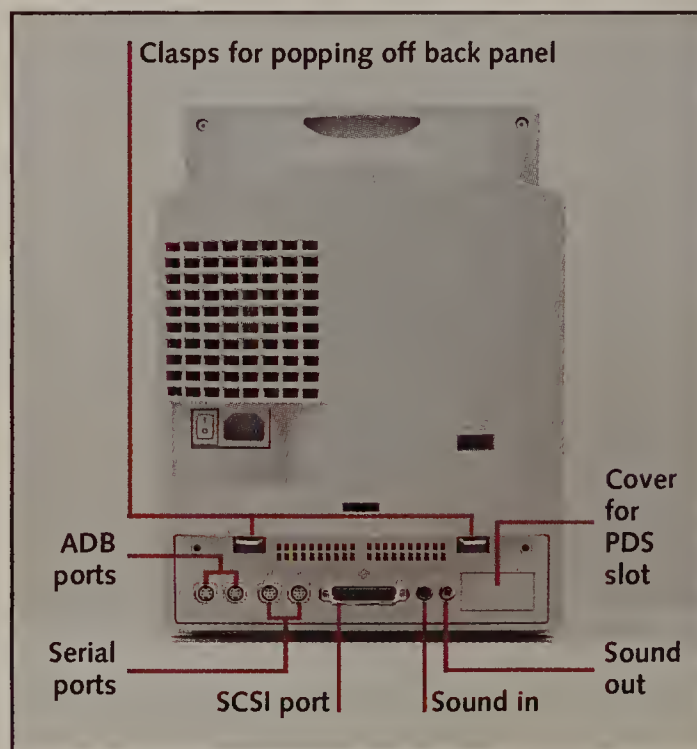
A Logical Logic-Board Design

AT LONG LAST, YOU CAN KISS YOUR torx screwdriver and case cracker—the indispensable tools for getting inside a compact Mac—good-bye.

It's extremely easy to get into the Color Classic to add an expansion board. The Classic's bottom back panel (where its seven ports are) has been revamped for easy access; just unlatch the clasps and off it comes. Inside, the logic board has been reengineered so that you can easily detach it, thanks to a direct connector that snaps the board into, and out of, place. You can then slide the board out, snap an expansion board into the PDS slot, slide the main logic board back inside the computer—giving it a delicate push to ensure the connector clips it back into place—and then snap the back panel on.

Because it is so much easier now to slip inside your Classic, a few words about Apple's warranty policy are in order. Apple recommends that upgrades to the logic board itself—RAM or VRAM, for instance—be performed by an authorized Apple dealer or other service provider (your company's technical-support staff, for example). If you do the job and accidentally cause some damage, your warranty doesn't cover the cost of repairing the damage or replacing the board. If the service provider does the job and causes damage, then the warranty covers the cost to fix it. However, if you pull out the logic board to add an expansion board—such as the Apple IIe emulation board—to the PDS slot, your warranty

does cover any damage you might do, except when the vendor of that expansion board specifies that an authorized dealer should install the board. The bottom line: While you're under warranty,



Seven Ports The Color Classic's ports include two ADB, two serial, standard SCSI, sound input, and sound output.

have a dealer or company tech-support person install RAM or VRAM. If you plan to install an add-in board, read the accompanying literature carefully in advance and have a dealer or tech-support person install the board if the vendor recommends doing so.

Math Coprocessor and More

APPLE HAS MADE SOME OTHER CHANGES to the logic board as well. Chief among these is a slot for an optional math coprocessor (\$79), something you don't have with the Classic II and LC II. Adding a math coprocessor to the Color Classic resulted in significantly speedier handling of FPU-intensive chores (Excel recalcs among them). Not surprisingly, however, the FPU's impact on other tasks was negligible, reinforcing the fact that FPUs really aren't necessary for the vast majority of Mac owners in general—and Color Classic owners in particular, who aren't likely to be performing heavy Excel recalcs.

The Color Classic's logic board includes two 512K ROM chips (compared with the Classic II's one 512K ROM chip). The ROM is based on the LC II and Quadra ROMs and was specifically designed for the Color Classic. The ROM was upgraded to include the Screen Power Saver and the keyboard Power on-off button, among other features.

With the Color Classic, Apple has phased out the floppy drive connector port in its low-end Macs in favor of offering two ADB ports ("Classic Comparisons"). This was inevitable, as internal hard drives don't add that much extra cost to a computer anymore, and as a result, fewer people need to run a computer from two floppy drives.

The Color Classic ships with 4MB of RAM standard. It has one dual-slot SIMM bank for installing two 1MB SIMMs, two 2MB SIMMs, or two 4MB SIMMs. If you install two 4MB SIMMs, you end up throwing 2MB of RAM away. The Color Classic, like the Classic II and LC II, can't use more than 10MB of RAM, due to the limitations of the memory address map in those computers.

Who Will Buy?

NOW THAT I'VE CONSIDERED what the Color Classic has to offer, I'm back at the same practicality question—does it make sense to buy one?

From a purely economical standpoint, consider this: A Classic II with 4MB of RAM and an 80MB hard drive retails for \$1079, while a similar Color Classic costs \$1389—a difference of \$310. Considering that the Color Classic gives you a slightly larger, color screen, one expansion slot, and an FPU slot, it's a good deal. (The Color Classic ships with the standard Apple keyboard, the new Apple

If you are in the market for a Classic II, forget it and buy a Color Classic. The difference in cost is about \$300. But the LC II or LC III is ultimately a better buy.

Desktop Mouse II, and System 7.1 fully installed.)

The cost comparison certainly spells doom for the Classic II. Apple plans to continue selling the II as long as there's a demand, but you can bet that the black-and-white compact Mac is on its way to oblivion. Besides, who wants black-and-white these days when you can have color?

A 4/80 Mac LC II, with standard keyboard and the new mouse but no monitor, retails for \$1169—\$220 less than the Color Classic. Add the 14-inch Macintosh Color Display (\$599), and the cost of the LC II system is \$1768—\$379 more than the Color Classic. Thus, for a few hundred dollars more you can buy an LC II with a 14-inch color monitor. Pay \$559 more and you've got an LC III, which is more robust and expandable (it's upgradable to up to 36MB of RAM, for example) than the Color Classic or LC II and supports a variety of monitors.

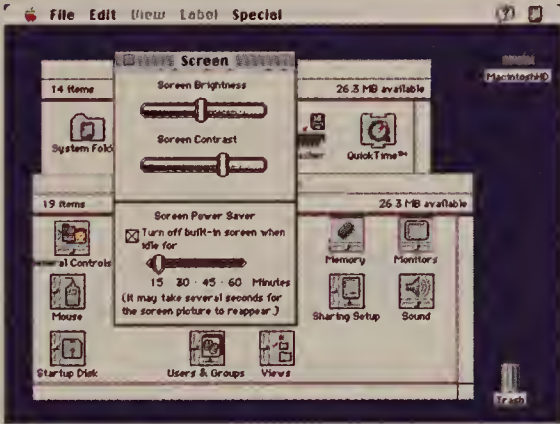
Conclusion? Strictly on a financial basis, if you were in the market for a Classic II, forget it and buy a Color Classic. Otherwise, the LC II or LC III is ultimately a better buy for the money.

But other factors complicate the issue. Size, for one. Because of its compact, all-in-one design, the Color Classic is perfectly suited for classrooms, dorm rooms, and many educational uses. The Color Classic is easy to set up and transport, it's less susceptible to tampering, and it's therefore a better choice than an LC II. The small footprint of the Color

Classic makes it a good choice for office or home users without much desk space to spare—the Color Classic is expected to be a big hit in Japan and Europe for this reason alone.

But if you're not worried about simple setup, desk space, or portability, and you want a computer you can grow with, I strongly suggest buying an LC model instead of a Color Classic. Even if you're not sure that you need the extra flexibility, consider this fact of life: once you take the plunge into color, there's no stopping you. After you use the Color Classic for a while and see its limitations, you'll want a larger color screen. Then you'll want 24-bit color, and before long you'll want another computer entirely.

As a result, the Color Classic makes a lot of sense for Apple—hook 'em with a small color screen and soon they'll want more. For many people, though, the Color Classic is not quite so practical. But it *is* cute. m



Adjusting Your Vision The Screen control panel lets you control brightness and contrast and determine how long the computer should be idle before the monitor shuts down.

Macworld Lab testing supervised by MARK HURLOW and TIM WARNER.



Color Classic Performance

	Processor Tasks	Drive-Access Tasks	Display Tasks	Math Tasks
Times are in seconds. Shorter bars are better.	We ran several tests that show how the different processors perform. Our tests included adding and subtracting numbers and finding a word, which depend mainly on the speed of the processor.	We ran tests that show how well each Mac performs on tasks that rely heavily on the hard drive. Our tests included opening and saving files, which require the processor to work with the hard drive.	We ran several tests that show how well each Mac performs on tasks that depend heavily on the speed of screen redraw. Our tests included scrolling, which requires the processor to work with the display circuitry.	We ran several tests that show how quickly math coprocessors of various speeds perform. Our tests included recalculations that involve scientific functions, which depend heavily on a math coprocessor.
Macintosh LC III	211	58	241	328
Color Classic (with FPU)	409	116	473	167
Color Classic (no FPU)	431	122	481	742
Classic II/Performa 200	442	111	414	764
Macintosh LC II	432	115	489	740

The Color Classic is a hybrid of the Classic II and the Mac LC II, so it's not surprising to find that its performance is extremely similar to those two computers (all have a 16MHz 68030 processor and a 16-bit data path). Even when an optional FPU is installed in the Color Classic, there's not much difference, except for math-intensive tasks. The new Mac LC III, with its 25MHz 68030 processor, 32-bit data path, and optional FPU, clearly provides the best performance among compact and low-cost color Macs.

LC III

The newest LC is more affordable than ever and as fast as a Mac IIci

When Apple introduced the original LC, the company was admitting that it needed a low-cost color computer in its line-up—that for many customers the benefits of the Macintosh interface didn't justify the machines' premium price. Eating humble pie worked—the LC and LC II became Apple's most popular Macs. The LC III continues the tradition, offering good performance at lowest-ever prices.

WHEN THE MACINTOSH LC FIRST CAME out in October of 1990, it had its share of naysayers. "It'll never sell," they said. "It's still too expensive (\$2400 for a system with 2MB of memory and a 40MB hard drive), it's not very fast, and it doesn't have many expansion options."

But sell it did—within a year the LC became Apple's best-selling Macintosh, with 560,000 units sold. It took Apple nearly a year and a half to update the LC to the LC II. Even then, the improvements were minor: a 68030 processor replaced the aging 68020, and memory was upped to 4MB on the logic board. Performance remained the same. Still, the LC II sold well—industry analyst Pieter Hartsook estimates that Apple sold 950,000 LCs and LC II's in 1992.

From what I've seen of the latest in the LC line, the LC III, I predict a continued streak of high-volume sales. Apple has finally fixed the few things that hindered the LC and the LC II: the LC III recognizes up to 36MB of memory (not just 10MB), there's a socket for an optional math coprocessor, and the built-in video circuitry supports more colors on larger monitors. Most important, Apple has increased the 68030 processor speed to 25MHz and added a 32-bit data bus so that users will see a real speed improvement over previous LCs. The upgrade is significant enough that Apple will continue to sell the LC II (and the Performa 400), not just replace it with the LC III.

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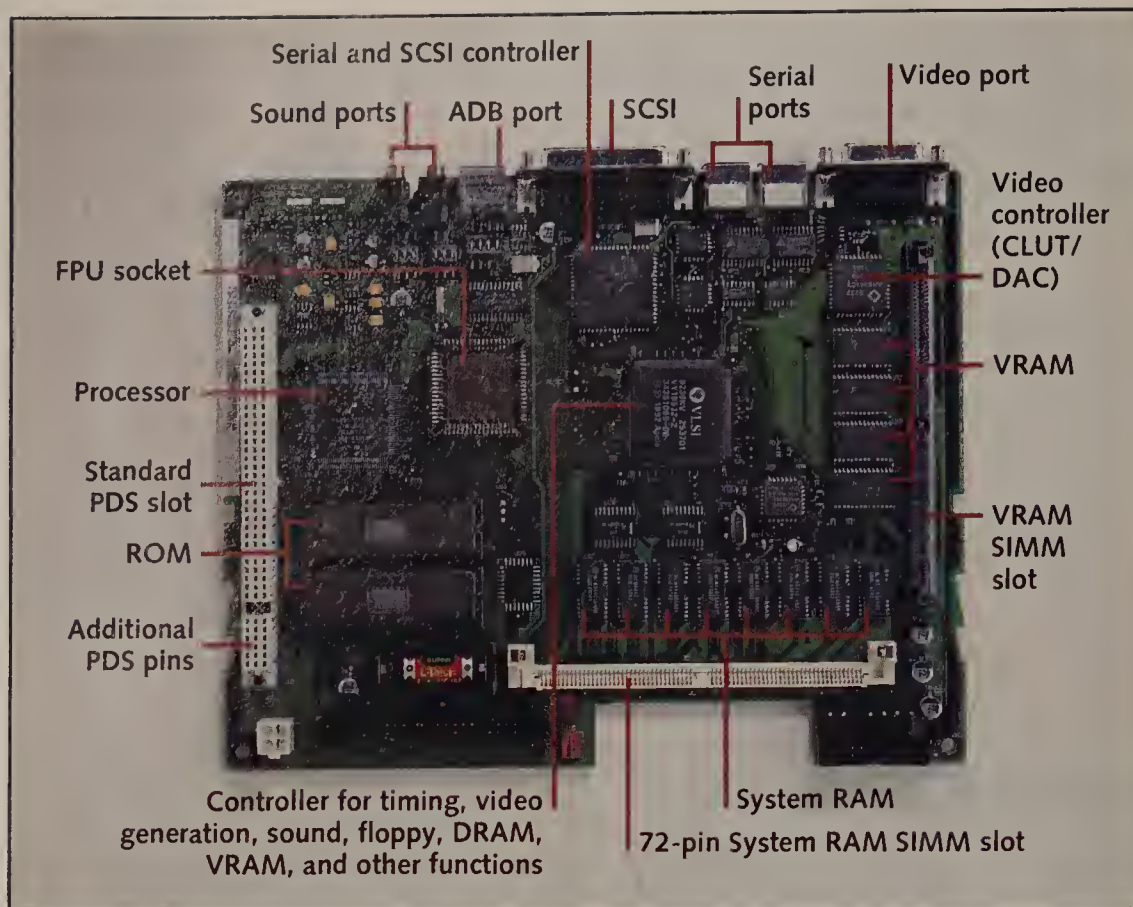
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The Logic Board Up Close The LC III's logic board is the same size and shape as the logic board of the original LC, but the LC III's greater functionality and low cost have led Apple to create more custom chips.

Oh, and by the way, the basic LC III with 4MB of memory and an 80MB hard drive will cost only \$1349 retail—that's \$700 less than the 4/80 version of the LC II sold for when it was introduced. A 4/160 configuration of the LC III will cost \$1669. All configurations will include a standard keyboard and a redesigned mouse, although some dealers may sell a slightly less expensive version of the LC III without a keyboard. At press time, Apple had not yet decided whether it would sell the LC III as part of the Performa line.

Speed Burst

THE 16MHZ 68020 LC AND THE 16MHZ 68030 LC II are by no means slouches. Although they certainly don't hit Quadra 950 speeds, they run common educational, home, and business applications well. The LC III runs twice as fast, meaning that this Mac more easily supports applications, such as QuickTime and video editing, that require snappy performance.

The LC III has the same 25MHz 68030 processor as the Macintosh IIci—the machine that was Apple's mainstream business Macintosh until the IIvx came along. In Macworld Lab tests, the LC III ran as fast as the IIci and even faster than the slim-line IIsi. The only exception was the math test, which depends on an FPU for a speed burst. In this test, the LC III did not include an FPU (an optional component for this machine); the IIci did include an FPU (a standard component).

The LC III's speed burst is due to the

32-bit bus as well as the slightly faster processor. The 68030 is a 32-bit processor; it handles data in 32-bit (4 bytes) chunks. The LC II has only a 16-bit data bus, meaning that data moves between the processor and memory only 16 bits (2 bytes) at a time. The slower data bus creates the same kind of bottleneck as two lanes of traffic trying to merge into one.

Expanding the LC III

APPLE HAS NOT CHANGED THE ORIGINAL LC's slim case design, so the LC III still has room for only one expansion slot, one 1/3-height hard drive, and one SuperDrive floppy drive. But because the functions of several of the LC II's logic board chips have been integrated into one custom chip, the LC III has more room on the logic board for additional features. Some changes are immediately apparent, while other changes may be noticed only when it's time to upgrade.

For instance, the LC III comes with 512K of video memory (VRAM), soldered onto the logic board, as well as a slot for adding 256K of VRAM. With 512K of video memory, the LC III supports 8-bit video (256 colors) on 13-inch, 14-inch, and 16-inch monitors, and 16-bit video on 12-inch monitors. For monochrome monitors, the standard LC III supports 8-bit video on 12-inch displays and 4-bit video (16 grays) on 15-inch portrait-size monitors. With an additional 256K of video memory, the LC III supports 16-bit color (32,768 colors) on 12-inch, 13-inch, and 14-inch monitors.

That's enough colors to display QuickTime movies as well as many images with near-photo-realistic quality. The additional 256K of VRAM also lets the LC III display 256 shades of gray on portrait monitors.

What's not immediately apparent with the VRAM is the efficiency with which you can now upgrade it. The LC II's logic board had a single SIMM socket for adding video memory. If you bought the LC II with 256K of VRAM and later wanted to upgrade it to 512K of VRAM, you had to discard the 256K SIMM and replace it with a 512K SIMM. The LC III has 512K soldered onto the logic board; a SIMM slot is available for adding an additional 256K of VRAM. You no longer have to waste a SIMM if you decide to upgrade video memory after purchasing a standard LC III.

Similarly, you wouldn't think that the expansion slot had changed, based on Apple's specifications. Like the LC II, the LC III has an expansion slot with 96 pins and accepts all of the boards that the LC II does, including the Apple IIe Card. The slot even retains the LC Slot moniker. But a look at the logic board reveals an additional section with 18 pins. Apple added those pins to support the signals necessary to make the slot run at the same 25MHz speed as the processor. (The 96-pin slot runs at 16MHz—the same speed as the processors in both the original LC and the LC II.) Thus, boards that need to hook directly into the processor, such as DayStar's PowerCache accelerators, can be redesigned to run on the LC III using all 114 pins.

More Memory

ANOTHER EXPANSION PLUS FOR USERS who want to work on several applications at once or dabble with memory-hungry multimedia work is the LC III's ability to recognize up to 36MB of memory. Apple still includes 4MB of memory on the logic board. But the company has updated the memory-control functions to recognize more than 10MB of RAM.

As part of its scheme to support more industry standards, Apple has designed the LC III's memory slot to accept the same 72-pin SIMMs that many DOS machines use. (The Centris 610, the Centris 650, and the Quadra 800 also support these 72-pin SIMMs.) Because these SIMMs are widely available, you should be able to find them more easily than traditional Macintosh SIMMs. But because 72-pin SIMMs differ from the ones in earlier Macs, you won't be able to take the memory from an older Mac and add it to the LC III. The LC III supports SIMMs with a capacity of 1MB, 2MB, 4MB,

I hope that Apple is **cranking** up its manufacturing line. With better **speed**, greater video and memory options, and the low price, the LC III is an **outstanding** bargain.

8MB, 16MB, or 32MB for a total memory capacity ranging from 5MB to 36MB.

Another first for the LC line is the addition of a socket for a Motorola 68882 math coprocessor on the LC III's logic board. You'll want this option only if you plan to use mathematical software or scientific applications. General spreadsheet functions such as addition and subtraction don't benefit from a math coprocessor. If you plan to perform modeling, rendering, or CAD tasks frequently, then you are better off buying at least a Mac Centris for its sheer processing power (see "Centris 610 and 650," in this issue).

The LC III also contains the standard array of ports and connectors (two serial ports, audio-in and audio-out ports, an ADB port, a SCSI connector, a LocalTalk connector, and, of course, a connector for hooking up an external monitor). The bite-size microphone is no longer bundled; instead it will be available as a stand-alone product. The sound input remains 8-bit. (CD-quality sound uses 16 bits; 8-bit sound, however, is perfectly appropriate for voice applications and recording system beeps.)

Should You Buy One?

I HOPE THAT APPLE IS CRANKING UP its manufacturing line. Demand for the LC III should be high, especially since Apple is offering an upgrade kit to LC and LC II owners for \$599. With the increase in speed, the greater video and memory options, and the low price, the LC III is an outstanding bargain.

The LC III also has the luxury of having a clear-cut place in the Macintosh line; the Color Classic is really its only competitor (see "Color Classic," in this issue). On the positive side, the Color Classic offers a compact design, a slightly lower price, and the LC expansion slot. On the negative side, it is not nearly as fast as the LC III, and its built-in screen is minuscule. Still, the Classic's lack of color in the past has been one of the reasons that people bought the LC instead.

As for the LC II, it should sell to people on a tight budget who would like the option of upgrading to a faster modular Macintosh when they can afford it. At press time, Apple estimated that there would be only about a \$200 price difference between the LC II and LC III with

4MB of memory and an 80MB hard drive. If that turns out to be true, then you should buy the LC III if you can—it's much improved over the LC II.

And there's no longer any reason to buy a IIsi or a IICI. The LC III runs at the same speed as the IICI and faster than the IIsi and includes many of the same features as those two Macs. If you need more expansion slots or larger compartments for hard drives than the LC III provides, but you think the speed is reasonable, you should opt for a Performa 600 or a IIVx. And if you really want a faster machine, check out the Centris 610 or 650.

The average user, however, cannot get a better bargain than the LC III. The fact that previous LCs have sold so well, and that Apple is keeping the LC II around for at least a while, bodes well for the life span of the LC family and the proliferation of third-party add-ons. And that's important as Apple continues to announce more and more new computers each year. **m**

Macworld Lab testing supervised by MARK HURLOW and TIM WARNER.



LC III Performance

Times are in seconds. Shorter bars are better.

Processor Tasks

We ran several tests that show how the different processors perform. Our tests included adding and subtracting numbers and finding a word, which depend mainly on the speed of the processor.

Drive-Access Tasks

We ran tests that show how well each Mac performs on tasks that rely heavily on the hard drive. Our tests included opening and saving files, which require the processor to work with the hard drive.

Display Tasks

We ran several tests that show how well each Mac performs on tasks that depend heavily on the speed of screen redraw. Our tests included scrolling, which requires the processor to work with the display circuitry.

Math Tasks

We ran several tests that show how quickly math coprocessors of various speeds perform. Our tests included recalculations that involve scientific functions, which depend heavily on a math coprocessor.

Macintosh LC III	211	58	241	328
Macintosh IICI	219	61	258	104
Macintosh IIsi	268	68	320	432
Macintosh LC II	432	115	489	740
Color Classic (with FPU)	409	116	473	167
Color Classic (no FPU)	432	122	481	742

The LC III runs twice as fast as its predecessor, the LC II, and twice as fast as the Color Classic. In fact, the LC III keeps pace with the IICI and outruns the IIsi—Macs that Apple previously considered midrange in performance. The only exception is in the math tests, which rely on a math coprocessor for speed gains. Macs that were tested with an FPU (the IICI and a Color Classic) ran noticeably faster than Macs tested without an FPU.

CENTRIS 610 & 650

Two new midrange performers replace the venerable Mac II line

Apple's new midrange line of Macintoshes, the Centris series, brings 68040 power at competitive prices. These machines redefine the basic business Macintosh. Apple continues its tradition of offering both a slim-line model (the Centris 610) and a full-size expandable model (the Centris 650) in the midrange. The Macintosh IIfx now defines the low end of the Centris line.

SIX YEARS AFTER ITS INTRODUCTION, the Macintosh II line has met its end. The first open-architecture Mac, the II was meant to make the Macintosh a business computer that could compete head-to-head against the business standard of the day, the Intel 80386-based PCs from Compaq, IBM, and scores of other vendors. Two years after its introduction, the original II gave way to the IIfx and the IIfx, two highly popular Macs that were smaller than the II yet were faster, cheaper, and had enough expansion options for most users. These Macs redefined the business user's Mac and remained essentially unchanged for the next four years—an eternity in the computer business.

Now it's time to bid adieu to the Mac II line. The availability of the fast Motorola 68040 processors, the demand for better video-display performance, and perhaps most important, the expectation for much lower prices caused by the success of Windows-equipped, 80486-based DOS PCs gave Apple the impetus to redefine its midrange Mac line. The result is the Macintosh Centris line, which includes the Centris 650, a successor to the IIfx in form and to the Quadra 700 in function; the Centris 610, a successor to the IIfx; and the IIfx, the 68030-based Mac released last fall that defines the Centris line's low end. The Centris 610 and 650 put the 040 processor squarely in the Mac mainstream.

B Y G A L E N G R U M A N



The Centris Macs are not just II's in new cases. Apple designed the systems from logic board on up to take advantage of highly integrated circuits that let Apple add greater functionality while greatly reducing manufacturing costs. Nothing underscores this twin benefit more than the fact that you can now buy an 040-based Mac system—including monitor, mouse, and keyboard—for a list price of about \$2500. Yes, \$2500 for a system that runs 1.5 times as fast as a IIci.

That low price signals Apple's intent to compete for the large business market in price, not just in features. The prices for all the new Macs show that Apple is serious about competing with inexpensive Windows PCs. And this new lower-price strategy has affected the existing Macs. For example, the IIfx announced just six months ago now costs a third less—\$1000—than when it was introduced.

Centris 650: New Business Standard

THE POWER USER'S BUSINESS MAC IS the Centris 650. It packs a processor with the power of a Quadra 900 in a IIfx's case, which means you get the benefits of both high performance and expandability, for boards as well as storage devices. And it does so for the same price as a IIci. (Because the Centris 650 uses the IIfx's case, IIfx owners can upgrade their systems to a Centris 650 by replacing the logic board.)

Processor

THE CENTRIS 650 BOASTS A 25MHz 68040 processor—that's the same processor found in the Quadra 700. One version of the Centris 650—the base model that comes with 4MB of system memory and an 80MB hard drive—uses a variant of the 040 called the 68LC040, which has the 040's built-in math coprocessor disabled. Most people won't miss the math coprocessor, since it is used mainly by scientific, computer-aided design, modeling, rendering, and some very high-end graphics programs. These are the very application areas that Apple is targeting with the Quadra series. Contrary to what you might think, spreadsheet recalculations rarely benefit from a coprocessor unless they are using specialized math functions (particularly trigonometric ones like sine and cosine).

If you need a math coprocessor, you can buy any other Centris 650 configured with more RAM or storage or you can later have a dealer replace the 68LC040 with a full 68040. Replacing the processor later is a fairly expensive proposition—a 25MHz 040 costs about \$450, if you can find one—so it's best to decide up front whether you want a math coprocessor.

System Memory

THE CENTRIS WILL BE SOLD IN TWO base configurations, one with 4MB of RAM soldered on the logic board, the

other with 8MB. The Centris supports 4MB, 8MB, 16MB, and 32MB SIMMs—its memory controller circuitry does not support the smaller-capacity (1MB, 512K, or 256K) SIMMs that previous Macintoshes support. With prices for 4MB SIMMs running about \$100 to \$150, this limitation hurts only companies or people who have a stock of 1MB SIMMs on hand.

Using 32MB SIMMs gives the Centris 650 a maximum RAM capacity of 132MB if there are 4MB of RAM on the logic board, and 136MB capacity if there are 8MB on the logic board. Bear in mind that the 32MB SIMMs are not yet common in Macintosh configurations. But that should change fairly soon, since versions are already available for Sun Unix workstations and Compaq Deskpro DOS PCs (Compaq uses its own type of SIMM, not the standard DOS SIMM). At press time, a 32MB SIMM costs about \$2000, or roughly twice as much per megabyte as a 4MB SIMM.

The Centris 650 uses standard 72-pin DOS SIMMs, as well as 72-pin Mac SIMMs—not the same SIMMs used in a IIci or in other Macs. The difference between the DOS and Mac 72-pin SIMMs is that those in DOS PCs (as well as many Unix workstations) have an extra chip that handles error correction, in addition to the chips used for the memory itself. Apple decided it wanted its users to be able to exchange memory freely with DOS machines, since this makes it easier for businesses to integrate the Mac into their computing stable. But don't expect this broad SIMM compatibility to automatically mean cheaper RAM—in comparing SIMM prices, *Macworld* found that Mac and DOS SIMMs cost about the same, although some dealers charge more for Mac SIMMs than DOS SIMMs while others do just the opposite. Whether you get the 72-pin SIMMs as DOS or Mac SIMMs, they should be 80-nanosecond RAM.

Perhaps the most subtle yet substantial innovation in the Centris 650 is its new memory architecture, which lets the Centris recognize memory of any capacity in any SIMM slot. You no longer need to worry about rules for placing memory. There's no longer any difference between a slot and a bank—a bank has just one slot, so a slot is a bank. That means you can fill one, two, three, or four banks by adding one, two, three, or four SIMMs—the Centris uses whatever RAM it finds. Also, you need no longer worry about whether the capacity of the SIMM used in one slot matches that of the SIMM in the neighboring slot—the Centris doesn't care. For example, when you add SIMMs

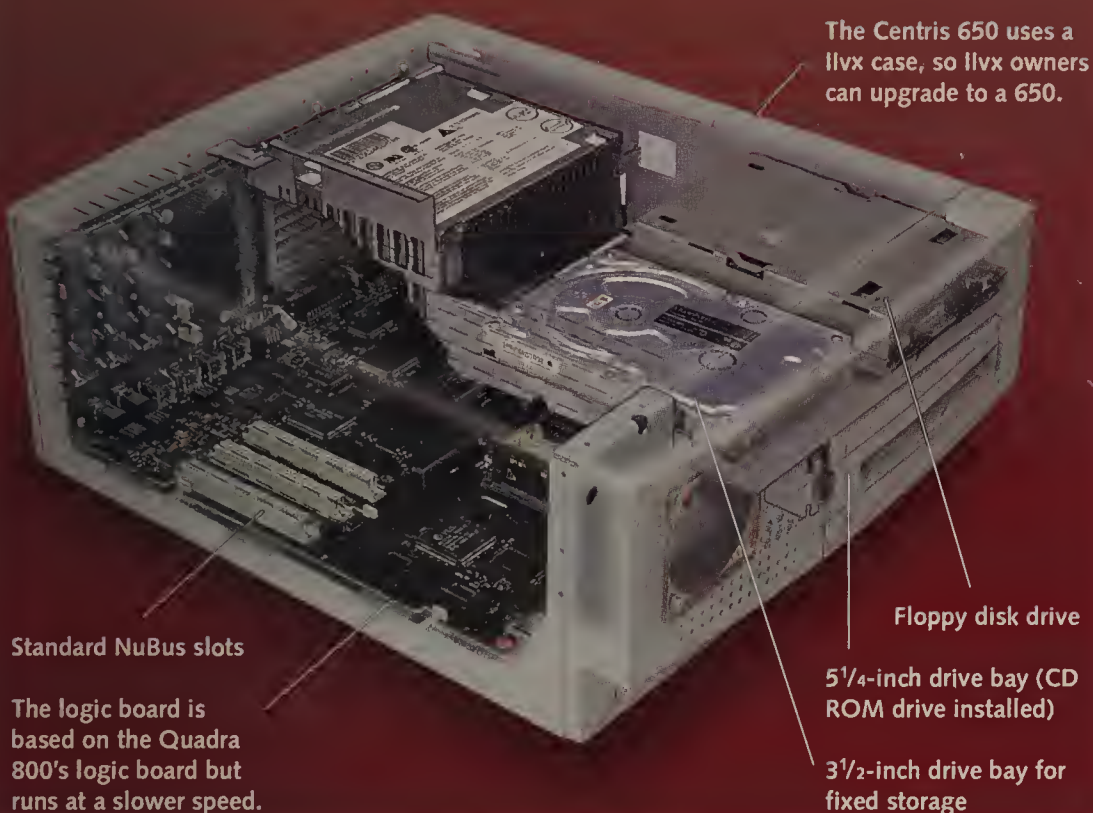
Designed for the Long Term

It looks like Apple designed the Centris line with the same longevity in mind as the Mac II line enjoyed. Instead of tweaking existing logic boards, Apple engineers developed a set of components—buses, specialized chips, and memory circuitry—for use in several Macs. Then the company decided which of the components would go in each Mac. By using one design for a whole product line Apple saves money while still providing extra oomph for the higher-end Macs. Thus, the Centris 610 and 650 share many of the components of the new Quadra 800, since they were developed in coordination. (In fact, they all shared the same code name: Wombat.) This coordinated approach should let Apple quickly develop new models to compete with the increasing sophistication of DOS and Windows PCs and Unix workstations.

For the near term, that is likely to mean advances in built-in circuitry, whether it be for memory, video, Ethernet, or sound. A trend for both Macs and PCs is to optimize the performance of subsystems like these rather than rely solely on the processor.

In the new Macs, the interleaved memory is one example of such optimization. Another is the continued miniaturization and combination of the specialized circuits, called ASICs (application-specific integrated circuits). For example, in the Centris Macs and Quadra 800, the ASICs that control memory have been consolidated into one ASIC, thereby speeding memory processing because information is being exchanged within one component rather than among three components as in earlier models. Another example is the reduction in number of SIMM slots. Instead of designing and manufacturing 8 or 12 slots and their accompanying circuitry, Apple saved costs by having just 4 slots. The fact that the 4MB SIMMs this strategy requires are plentiful and cheap means that Apple's cost savings won't be an added cost for buyers.

Inside the Centris 650



80MB hard drive) you must buy an Ethernet NuBus board or external Ethernet box. All other configurations come with Ethernet built in.

Storage Options

BECAUSE THE CENTRIS 650 USES THE same case as the IIvx, it has an internal 5 1/4-inch drive bay that can hold a CD ROM drive, SyQuest drive, tape drive, or other removable storage device. This internal bay reduces desktop clutter.

As part of its push to make multimedia a standard part of business computing, Apple is selling a CD bundle that includes a microphone, the AppleCD 300i high-speed CD ROM drive, and a CD that has System 7 installed. You can restart from the CD and reinstall the System in case you ever damage the hard drive. The start-up CD has a version of the At Ease interface program (which the Performa consumer series of Macs includes to aid new users) to make System 7 reinstallation a snap. The Centris's ability to restart from a CD ROM is due to an addition to the logic board's circuitry (the Centris 610 and Quadra 800 also have this ability). The CD ROM bundle—8MB of RAM, 1MB of video RAM, a microphone, and the Apple CD ROM drive—will have a list price of \$3999, or about \$400 more than the cost of a Centris 650 system without it.

The Centris 650 comes with a choice of three capacities for its internal hard drive: 80MB, 230MB, and 500MB. Recognizing that modern system software, applications, and multimedia data files all take gobs of disk space, Apple now offers large-capacity hard drives like the 500MB option for the Centris line and the 1-giga-byte option for the new Quadra 800. (Until now, Apple's highest-capacity hard drive had been a 400MB drive available only on the high-end Quadras; Apple's configurations for the midrange Macs

Expansion Options

THE CENTRIS 650 OFFERS THREE NUBUS slots and one Processor Direct Slot (the same slot as used in the Quadras). That's the same number of NuBus slots as in the Mac IIci. The PDS is located behind one NuBus slot, so you can't use those two slots simultaneously with standard boards because a board placed in one slot covers the other slot.

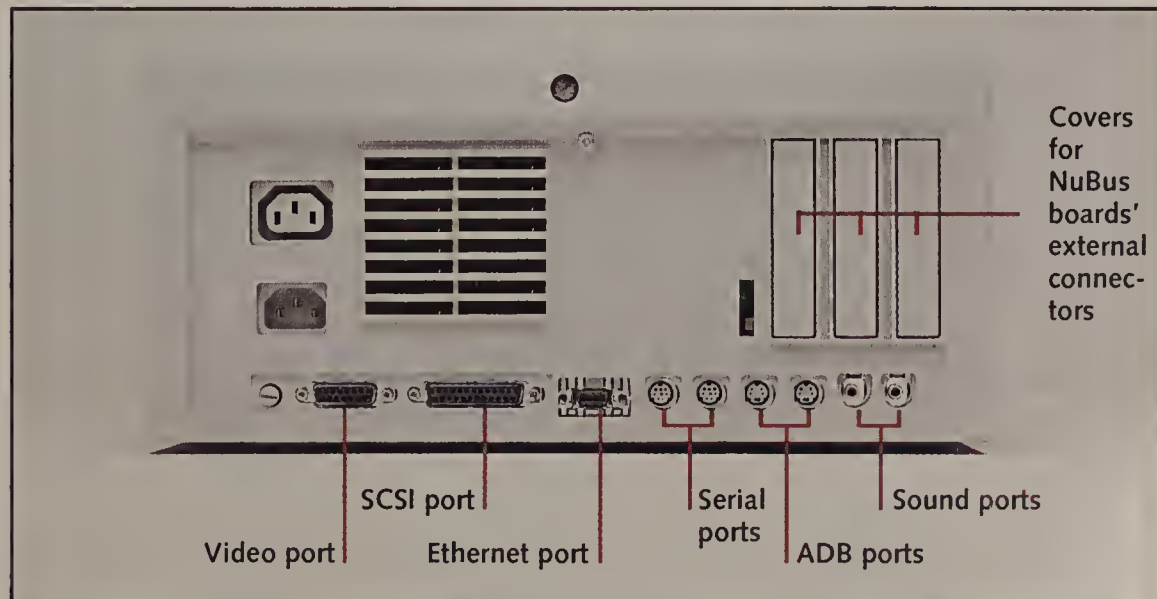
The Centris 650 has the full complement of standard Mac ports: two serial, two ADB, and one SCSI. That SCSI port is a high-speed port, which faster hard drives can take advantage of to transfer data more quickly. And like the IIvx, the Centris 650 includes mono sound-in and stereo sound-out ports.

If you want to add Ethernet to the base model (with 4MB of memory and an

to a Mac IIci, which has four slots in each of two banks, you must fill all four slots with SIMMs of the same capacity. Plus, if you use different-capacity SIMMs in the two banks, you must put the higher-capacity SIMM in Bank B if you use the IIci's built-in video. So to get an extra 12MB, you have to add four 2MB SIMMs in Bank B and four 1MB SIMMs in Bank A. With the Centris 650, you can get an extra 12MB by adding an 8MB SIMM in one slot and a 4MB SIMM in another, or by adding a 4MB SIMM to each of the three slots.

Another innovation, called memory interleaving, offers some speed improvements. If you put SIMMs of the same capacity in neighboring slots, the Centris 650's memory circuitry interleaves the two SIMMs. Interleaving means that the processor can communicate in parallel with the two SIMMs (as if they were one large SIMM). This lets the processor communicate in *burst mode*, in which it sends a lot of data at once. The new Quadra 800 also uses this interleaved RAM technique (see "Quadra 800," in this issue).

Practically, this means the processor has enough flexibility in how it places data and instructions in memory to boost speed by 10 percent in some cases. In spot testing, Macworld Lab found no performance gain with memory interleaving, even for programs like Photoshop that do massive calculations in memory. Expect to see speedup in only a few programs—those that consistently work on a lot of data in memory.



Back Panel Up Close The back panel of the Centris 650. The 610 has the same ports in the same order.

were limited to hard drives of 230MB.) The Centris also comes with the standard 1.44MB SuperDrive.

To power all these devices, the Centris 650 has a 112-watt power supply; by comparison, the IIfx also uses a 112w supply, while the Quadra 950 uses a 300w supply. Apple designed the Centris so that each slot gets as much power as it needs, up to the amount of power available. Apple says each NuBus slot can power a 15w board without difficulty. A typical accelerator or 24-bit video-display board uses between 8w and 12w.

Video Support

THE BUILT-IN VIDEO CIRCUITRY HANDLES all standard Apple monitors (12-inch, 14-inch, 15-inch portrait, 16-inch, and 21-inch) and 19-inch monitors. The base Centris 650 model comes with 512K of video RAM, which supports 8-bit color depth (256 colors) on monitors as large as 16 inches. Expanding the VRAM to 1MB gives you 16-bit color depth (32,768 colors) on these same monitors and 8-bit color depth on 19-inch and 21-inch monitors.

The built-in video also supports "typical" VGA monitors found on DOS PCs. *Typical* here means that the Apple video circuitry handles the common video tim-

ings used by most VGA monitors, but the circuitry is not compatible with the Video Electronics Standards Association's Super VGA standards, so not all Super VGA monitors (especially those with high refresh rates) work with the Centris 650. Still, you can drive most VGA and Super VGA monitors—certainly any that have multisyncing capability—at 8-bit color, at the standard 640-by-480-pixel (14-inch monitor size) and 800-by-600-pixel (16-inch monitor size) resolutions. You can also drive monitors that follow the Super-Mac timing for 1024-by-768-pixel (19-inch monitor size) resolutions; most multisync monitors can lock on to that signal. If you use a VGA or Super VGA monitor, you need a Mac-to-VGA adapter, and you need a different one for each resolution because of how the Mac senses a monitor's resolution.

Performance

MACWORLD LAB TESTS SHOW THAT THE Centris 650 has more than twice the overall performance of the former Mac business standards, the IIfx and the IIfx (see "Centris 610 and 650 Performance"). The Centris 650 fared best in math and basic processing, thanks to the 040 processor used. For tasks involving peripherals like video and storage, the

Centris 650 was between 1.5 and 2 times as fast as the IIfx and IIfx. It also edged out the Quadra 700 and IIfx in all tests.

Price

WHAT DOES ALL THIS COST? NOT MUCH, especially by Apple standards. Apple will offer several configurations of the Centris 650. "What a Centris Costs" shows the prices and specifications for each setup. The base model—which comes with 4MB of RAM, 512K of VRAM, and an 80MB hard drive—will have a list price of \$2699. The standard keyboard and a 14-inch color monitor together cost about another \$750.

Street prices should be about 20 percent lower than list prices. That means a typical Centris 650 business configuration—one with 8MB of RAM, 512K of VRAM, a built-in math coprocessor, and an 80MB hard drive, as well as a keyboard and 14-inch monitor—will have a street price of about \$3500. Compared with a similarly configured 80486-based Windows system, that's about an \$800 premium for the benefits of Apple's integrated hardware, software, and interface. Another way to look at it is that you can now get the equivalent of a Quadra 700 for what the former business-line Macs—a IIfx or IIfx—cost just a few months ago.

Inside the Centris 610

Size of a typical 12-inch NuBus board

Floppy disk drive

5 1/4-inch drive bay (CD ROM drive installed here)

3 1/2-inch hard drive

NuBus boards for the Centris 610 are limited to 7 inches, a size few vendors currently support. (The size of a typical NuBus board is 12 inches.)

Lack of space for a heat sink led Apple to disable the processor's built-in math coprocessor to reduce heat emissions.

Cover for NuBus board's external connectors

Who Offers 7-Inch Boards?

The Centris 610 accepts only NuBus and Processor Direct Slot boards that are 7 inches long. Most boards are longer than that (up to 12 inches), accommodating Macs previously designed with longer slots. The 7-inch limit is part of a NuBus standard expected to be approved this spring, and Apple has advised developers to stay within that limit. Regardless of Apple's urging, most vendors do not have boards that fit in a Centris 610. Even most of Apple's own boards do not fit into the smaller slot. Centris 610 owners who want to expand the Mac will be restricted in their purchasing options.

Macworld surveyed 40 vendors in four board categories—Ethernet, 24-bit video display, video capture, and accelerator—to see what boards fit into a 7-inch slot. We found that 7-inch boards are available in only one category: Ethernet.

The 7-inch Ethernet NuBus boards available at press time were the following:

- Apple Ethernet NuBus Board, Apple Computer (408/996-1010)
- E6020, Cabletron Systems (603/332-9400)
- EtherPort 2 and EtherPort 2T, Eagle Technologies (800/733-2453)
- FastNet Three, Dove Computer Corporation (919/763-7918)
- GatorCard/E, Cayman Systems (617/494-1999)
- GeoLink Card series, Chesapeake Systems (301/583-7717)
- PhoneNet Card and PhoneNet StarController EN, Farallon Computing (510/814-5000)
- Sonic Ethernet series, Sonic Systems (408/736-1900)

Asanté Technologies, Dayna Communications, E-Machines, Newer Technology, and Tech-Works said they would have 7-inch boards later this year.

For the other board types, Radius said it would ship later this year a 7-inch version of its PrecisionColor 24x 24-bit video-display board, and E-Machines plans to offer 7-inch versions of its ColorLink series of combined video-display and Ethernet boards.

—JOANNA PEARLSTEIN

Centris 610: A Slim-Line 040

ALTHOUGH IT PACKS A LOT OF POWER for a good price, a Centris 650 may be too expensive for many people. After all, systems that cost between \$1500 and \$2500 make up the majority of computer sales—these prices are lower than the expected street price of even the least-expensive Centris 650 configuration.

That's where the slim-line Centris 610 comes in. It looks like a IIsi but shares many of the features of the larger and more powerful Centris 650. And the street price for a basic Centris 610 system is expected to start around \$2000, which makes it extremely attractive to small businesses and home users.

Basic Features

THE CENTRIS 610 USES THE SAME 68LC040 processor found in the base model of the Centris 650, in which the math coprocessor is disabled. The logic board has 4MB of RAM soldered on it, and can accept 4MB, 8MB, 16MB, and 32MB SIMMs.

There are the standard one SCSI, two ADB, and two serial ports, as well as mono sound-in and stereo sound-out ports. A microphone is not included. The built-in video circuitry comes with 512K of VRAM, enough to drive 16-inch and smaller monitors at 8-bit color depth; the VRAM is expandable to 1MB to handle these same monitors at 16-bit color

depth. Ethernet is built in, except on the base 4/80 model. For that model you can add an Ethernet board or external SCSI box later.

There is a 5¼-inch drive bay for a removable storage device, like a CD ROM or SyQuest drive. The 610 also has room for an internal hard drive. You can purchase a 610 from Apple with an 80MB or 230MB internal hard drive. And there is a CD bundle like that for the Centris 650; the \$2959 bundle includes 8MB of RAM, 1MB of VRAM, a 230MB hard drive, a microphone, and the AppleCD 300i CD ROM drive.

Processor

THE CENTRIS 610 USES THE SLOWER 20MHz 68LC040 chip (the 650's processor runs at 25MHz). Unlike with the 650, there is no option to get configurations with a full 68040 (which includes a math coprocessor) or to replace the 68LC040 with a full 68040.

Apple says it is unlikely that many third-party developers will offer a replacement processor with a math coprocessor because the extra heat generated would require a heat sink, and there is little room for such a device in the Centris 610's case. People who need a math coprocessor are also likely to need a faster processor and more expansion options than a slim-line Mac provides, so

this limitation doesn't affect the 610's intended users.

System Memory

ANOTHER SIGNIFICANT DIFFERENCE IS the maximum RAM capacity: the Centris 610 supports 68MB compared with the 650's 136MB. This difference is due to the fewer SIMM slots on the 610—two, versus the 650's four—as well as to the fact that the 610 comes with 4MB soldered on the logic board, not a choice of 4MB or 8MB as in the Centris 650. Also, the Centris 610's memory is not interleaved, so it's less efficient in transferring data—and thus a little slower—than the 650's memory for some applications.

NuBus Limits

THE MAJOR DIFFERENCE BETWEEN THE two Centris Macs based on size is the lack of a NuBus slot in the Centris 610. Through an optional \$99 adapter that goes in the 610's expansion slot, you can add a NuBus slot that accepts only 7-inch boards. (Most boards are longer.)

This 7-inch limitation is particularly bothersome for owners of NuBus boards, which are a popular way to add functionality. Many vendors do not offer 7-inch boards (see "Who Offers 7-Inch Boards?").

Because the 7-inch size is part of the revised NuBus standard that has been in the works for two years (and is expected to be adopted this spring) by the Institute of Electrical and Electronics Engineers (IEEE), a standards-making body, Apple claims that vendors bear the responsibility.

WHAT A CENTRIS COSTS

List Price ¹	RAM	VRAM	Hard Drive Capacity	Other ²
Centris 650				
\$2699	4MB	512K	80MB	none
\$3189	8MB	512K	80MB	E, M
\$3559	8MB	512K	230MB	E, M
\$3999	8MB	1MB	230MB	C, E, M
\$5129	24MB	1MB	500MB	E, M
Centris 610				
\$1859	4MB	512K	80MB	none
\$2149	8MB	512K	80MB	E
\$2519	8MB	512K	230MB	E
\$2959	8MB	1MB	230MB	C, E
Mac IIvx				
\$1899	4MB	512K	80MB	M
\$2389	4MB	1MB	80MB	C, M
\$2269	4MB	512K	230MB	M
\$2459	8MB	512K	230MB	M

¹ Apple's expected list prices, including SuperDrive and mouse. ² C = CD bundle (AppleCD 300i CD ROM drive and microphone); E = Ethernet; M = math coprocessor.



Centris 610 and 650 Performance

Times are in seconds. Shorter bars are better.

Processor Tasks

We ran several tests that show how the different processors perform. Our tests included adding and subtracting numbers and finding a word, which depend mainly on the speed of the processor.

Drive-Access Tasks

We ran tests that show how well each Mac performs on tasks that rely heavily on the hard drive. Our tests included opening and saving files, which require the processor to work with the hard drive.

Display Tasks

We ran several tests that show how well each Mac performs on tasks that depend heavily on the speed of screen redraw. Our tests included scrolling, which requires the processor to work with the display circuitry.

Math Tasks

We ran several tests that show how quickly math coprocessors of various speeds perform. Our tests included recalculations that involve scientific functions, which depend heavily on a math coprocessor.



Not surprisingly, the Centris 650 is faster than earlier midrange Macs. And, because of improvements in its logic board design, the 650 performs better than the Quadra 700. The Centris 610 comes close to the Centris 650 and Quadra 700 in most tests. The major exception is engineering-oriented math processing, since the Centris 610 has no built-in math coprocessor. The now-ancient IIx bears up well, particularly for processor-oriented tasks.

ty for keeping their boards within that size. However, third-party vendors have long designed their NuBus boards based on the more spacious earlier Mac designs.

Apple claims that the 7-inch NuBus limitation should not be a problem because users won't need NuBus options like video-display boards, since such common functions are built into the Centris 610. That's not true. If you want 24-bit display (16.7 million colors), you need a board, since the built-in video supports only 16-bit display. You also need a board if you want to do video capture. If such options make sense (and they do) for the less-powerful earlier Macs like the IIx and IIci, they certainly make sense for the Centris 610. Apple says that users wanting such features would probably buy a Centris 650 instead. I agree: the Centris 650 is a better business machine, and those seeking a slim-line Mac with moderate power should look at the new 25MHz 68030-based LC III before deciding on a 20MHz 040-based Centris 610 (see "LC III," in this issue).

Performance

AS WITH THE CENTRIS 650, THE CENTRIS 610's 040 processor gives it fast overall performance—the 610 is about 1.6 times as fast as a IIci or IIvx. It is nearly as fast as a Quadra 700 for all tests but math processing (here, it was slower than all other midrange Macs tested but the IIsi). That's not surprising, since the Centris 610 has no math coprocessor. Unless you are using scientific, rendering, or CAD programs that need trigonometric and related math functions, you'll find the Centris 610 to be a fast business machine.

Price

LIKE THE CENTRIS 650, THE 610 COMES in a range of configurations, which are detailed in "What a Centris Costs." A base-configuration Centris 610 system—plus a 14-inch color monitor and standard keyboard—should have a list price of about \$2500.

Although Apple is determinedly comparing the Centris 610's price with similarly equipped Windows-based 486 PCs, a direct comparison is difficult because the few slim-line PCs available offer four to eight standard expansion slots (obviously, they're not as slim as the Centris 610). A similarly powered, full-size Windows PC can cost as much as \$1000 (list price) less than a Centris 610.

A more relevant comparison is between the Centris 610 and the IIvx. The

prices are comparable for similarly equipped models—the choice you must make between these two Macs is processing power (in the Centris 610) and expandability (in the IIvx).

IIvx: Entry-Level Office Mac

ALTHOUGH CENTRIS IS NOT PART OF its name, the IIvx is part of the Centris midrange line. Why the name difference? Apple lawyers were unable to complete the trademark check for the Centris name before the IIvx was released four months ago (see "The Macintosh IIvx," *Macworld*, December 1992). Apple says it will not rename the IIvx.

The only 68030-based computer in the revamped midrange Mac lineup, the IIvx offers computing power similar to that of the IIci, the former business stan-

MIDRANGE MACS COMPARED

Availability	Model	List Price* (Base Model)	RAM/Hard Drive Capacity (Base Model)	Processor	Processor Speed
●	LC II	\$989	4MB/40MB	68030	16MHz
●	IIvi	varies by country	4MB/80MB	68030	16MHz
●	IIsi	\$1729	3MB/40MB	68030	20MHz
●	IIci	\$2719	5MB/80MB	68030	25MHz
●	LC III	\$1349	4MB/80MB	68030	25MHz
●	Duo Dock with Duo 230	\$3688 †	4MB/80MB	68030	33MHz †
●	Performa 600	varies by dealer	4MB/160MB	68030	32MHz
●	IIvx	\$1899	4MB/80MB	68030	32MHz
●	Centris 610	\$1859	4MB/80MB	68LC040	20MHz
●	Centris 650	\$2699	4MB/80MB	68040 †	25MHz

● = a current Mac; ● = a Mac expected to be discontinued this spring. * Prices include a mouse for all Macs and adapter (\$99) needed to add NuBus board; board must be no longer than 7 inches. † Except for base model.

dard for Macintosh users. While the IIfx's horsepower was once considered enough for a business power user, the increasingly complex and slow word processors and spreadsheets of the day, not to mention System 7, have eaten away at that power. Today, the 32MHz 68030-based IIfx—even with its 32K cache—is at the low end of business computing, no longer the high end. But its processing power is more than adequate for many business tasks like word processing and basic spreadsheet use.

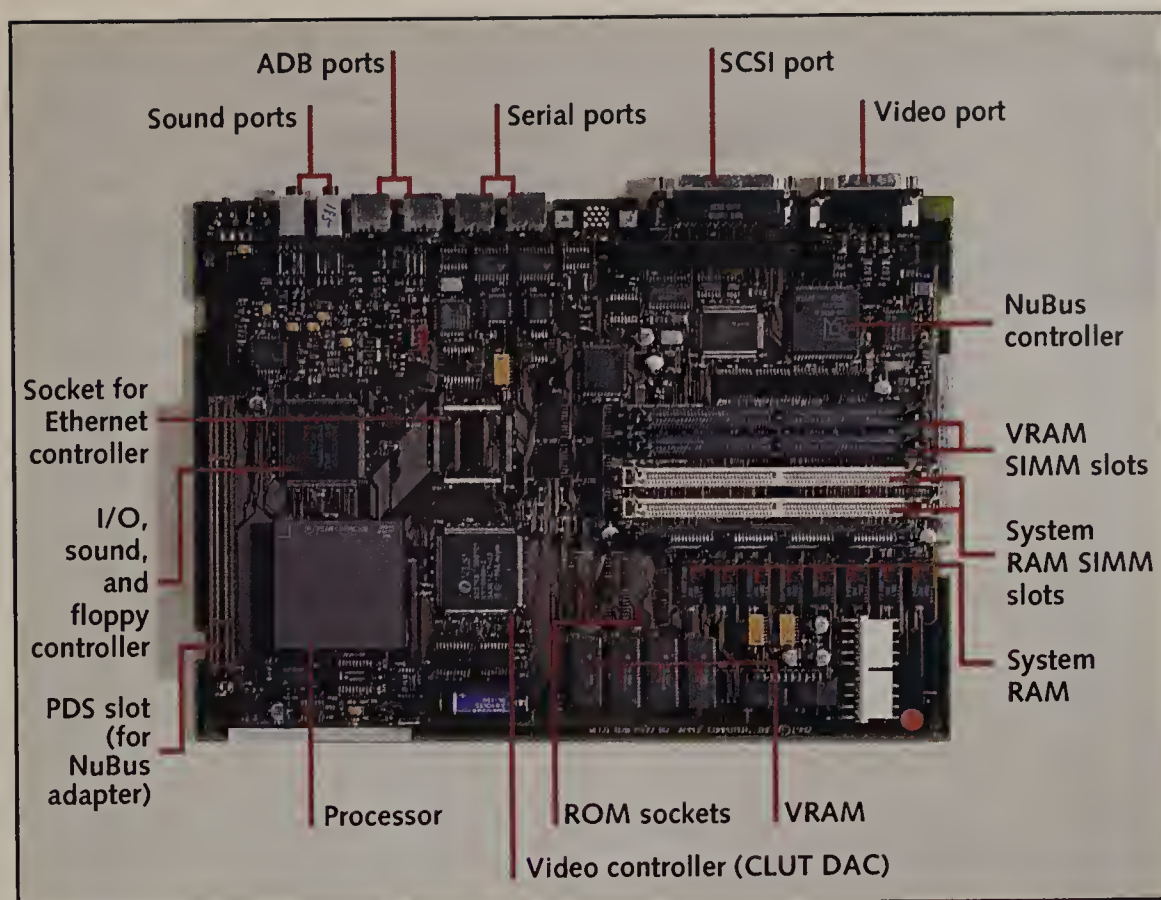
Indeed, people with that basic level of work need, may find that the lower-priced, lower-speed, and less-expandable LC II and new LC III also suit their purposes (see "LC III," in this issue). These users probably don't need the expansion options the IIfx provides, and their businesses will be attracted by the LCs' low prices. The LCs are fine business machines—they didn't become the best-selling Macs for no reason.

Because of the new Centris Macs and LC III, Apple has dramatically lowered the price of the IIfx since its introduction. The base IIfx model—with 4MB of RAM, 512K of VRAM, and an 80MB hard drive—that then had a list price of \$2949 now lists for \$1899.

Which Is Right for You?

FOR THE LONG TERM, YOU CAN COUNT on a spate of new models every year with more power and more capabilities. But if you're buying now, what do you choose?

Clearly, the Centris 650 is the business Mac of choice for anyone doing intensive business work, such as newsletter publishers, financial modelers (and others who work with complex spreadsheets and databases), graphic artists, multimedia developers, and documentation specialists.



The Logic Board Up Close The Centris 610's logic board.

The case for the Centris 610 is less clear. The NuBus limitation seems to clash with the processing power offered by its 20MHz LC040 and built-in multimedia support. If you have that kind of processing power, you'll probably want the Centris 650's expansion options at some point, especially if you buy into Apple's vision of QuickTime as the next desktop publishing, a computing-intensive creative tool that migrates from the few to the many. As a machine for running multimedia presentations or as an inexpensive business machine for people doing black-and-white publishing or moderate financial modeling, the Centris 610 makes sense.

But for the bulk of business users—the administrative assistants and secre-

taries and report writers—the LC II, LC III, and IIfx make more economic sense while also providing fine performance. The LCs provide the lowest cost overall and the IIfx the lowest cost for an expandable business Mac. If you use just Microsoft Word, WordPerfect, Microsoft Excel, or Lotus 1-2-3 all day, these are the business Macs for you.

Each midrange Mac was designed for a different type of user, offering a clear trade-off between function and price. There's no reason that everyone in your company should use the same model—there's a good option for everyone. The Centris line delivers that. **m**

Macworld Lab testing supervised by MARK HURLOW and TIM WARNER.

Math Coprocessor	Base RAM	Maximum RAM	Base VRAM	Maximum VRAM	Number of NuBus slots	Number of Processor Direct Slots	Hard Drive Capacities	Built-in Ethernet
not supported	4MB	10MB	256K	512K	0	1	40MB, 80MB	no
included	4MB	68MB	512K	1MB	3	1	80MB, 230MB	no
optional	3MB	17MB	NA	NA	1 [†]	1 [†]	40MB, 80MB, 160MB	no
included	4MB	8MB	0K	0K	3	0	40MB, 80MB, 160MB	no
optional	4MB	36MB	512K	768K	0	1	80MB, 160MB	no
optional	4MB	24MB	0K	512K	2	0	any third-height drive	no
optional	4MB	68MB	512K	1MB	3	1	80MB, 230MB	no
included	4MB	68MB	512K	1MB	3	1	80MB, 230MB	no
not supported	4MB	132MB	512K	1MB	1 [§]	0	80MB, 230MB, 500MB	yes
included	4MB or 8MB	132MB or 136MB	512K	1MB	3	1	80MB, 230MB, 500MB	yes

a keyboard for LC II and LC III. [†] Optional adapter (\$199) needed to add either NuBus or PDS board. [‡] Duo 210 costs \$3328 and has a 25MHz 030 processor. [§] Optional

QUADRA 800

The new high-end Mac performs like
a Quadra 950 at a lower cost

With each new product introduc-

tion, Apple's Macintoshes get

smaller, cheaper, and faster. The

Quadra 800 is no exception. The

Quadra 800 runs about as fast as

the top-of-the-line Quadra 950

but comes in a more compact case.

And, in some ways, the Quadra

800 offers more expandability

than the Quadra 950. Apple's

latest Quadra will be the

mainstream choice for high-

performance computation.

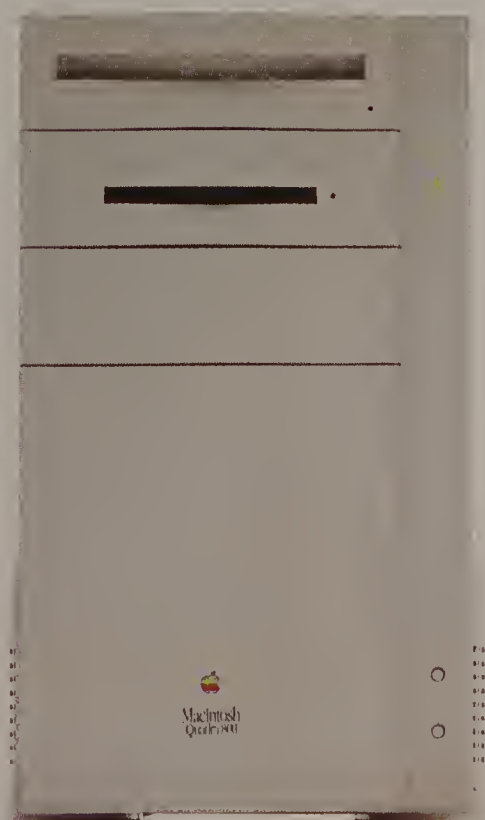
APPLE'S QUADRA 800 DELIVERS STRONG performance at a nice price. It's the kind of machine that color desktop publishers, product designers, video editors, multimedia authors, and others who are pushing the desktop computing limits have needed but often couldn't afford.

The Quadra 800 uses a 33MHz 68040 running on a 33MHz system bus, just like a Quadra 950. The Quadra 700, by contrast, has a 25MHz 040 and a 25MHz bus. The Quadra 700 also has a slower I/O bus. On the Quadra 800, all of the input/output is directly connected to the system bus to make input/output faster. Because the Quadra's processor is a full 68040, there's a math coprocessor and the instruction and data caches are built in.

Not Just a 700 Replacement

IF YOU STROLLED BY ONE, YOU COULD easily mistake a Quadra 800 for a Quadra 700. They're roughly the same size (the 800 is about 2 inches larger along each dimension), and you might not notice at first the sculpted curve that marks the Quadra 800 as a current-generation Mac. But this first appearance is deceiving, because inside, the Quadra 800 is a more powerful computer. In fact, it's about as powerful on paper as the Quadra 900 that was discontinued last year, and Macworld Lab tests show that it is about 15 percent faster than the 900 and—surprise—about

B Y G A L E N G R U M A N



8 percent faster than the 950. Compared with the Quadra 700, the 800 is 33 percent faster overall. And the Quadra 800 is nearly 200 percent faster than a IIci or IIfx. There's no single reason for the 800's better performance—Macworld Lab tests show that the Quadra 800 does better both in raw processing and in working with peripherals like video and storage.

Although the Quadra 800 is positioned to replace the 700, the 800 is more appropriately an alternative to the Quadra 950. At 1767 cubic inches and 25 pounds, the 800 is a midsize tower when compared with the Quadra 950's 3410 cubic inches and 37 pounds. (The slim Quadra 700 comes in at 942 cubic inches and 13 pounds.) Consider what the Quadra 800 offers and you'll see why it's likely to be the high-end Mac of choice. The real Quadra 700 replacement is the new Centris 650, which was developed in tandem with the Quadra 800 (see "Centris 610 and 650," in this issue).

System Memory The Quadra 800

comes with 8MB of RAM on the logic board, and you can expand the memory to 136MB by adding 32MB SIMMs in each of the 4 SIMM slots. While 32MB SIMMs are not yet easily available in the Mac market, they are appearing in other markets and should soon be available for use in the Quadras. They are likely to cost about \$2000 per SIMM. If you don't need that much RAM, the Quadra 800 can also accept 4MB, 8MB, and 16MB SIMMs. The Quadra 800's memory circuitry doesn't support lower-capacity SIMMs, like the 1MB SIMMs used on many earlier Macs. But with the price of 4MB SIMMs running at about \$100 to \$150 (compared with a 1MB SIMM's price of about \$40, or \$160 for 4MB), it's clear that the 4MB SIMMs will soon be the basic size for most RAM.

One thing that might make 32MB SIMMs available sooner rather than later is the fact that the Quadra 800 uses standard 72-pin DOS SIMMs as well as 72-pin Mac SIMMs. (These 72-pin SIMMs are not the same SIMMs that were used

in earlier Macs; only the Quadra 800, the Centris 610 and 650, and the LC III support this RAM type.) DOS SIMMs have an extra chip to handle error correction—though most modern PCs no longer need it—to be backwardly compatible with earlier PCs. This means that Macintosh users can easily share SIMMs with their DOS and Unix workstation colleagues. Because DOS and Mac SIMMs are roughly the same price, expect no savings—or added expense—from this new compatibility.

Whatever your source of SIMMs, make sure you buy 70-nanosecond memory for the Quadra 800—that's faster memory than the 80ns RAM required for the Quadra 950. (Changes to the memory system's design make faster RAM necessary to run at peak speed.) The faster RAM is one reason the Quadra 800 outperforms the 950.

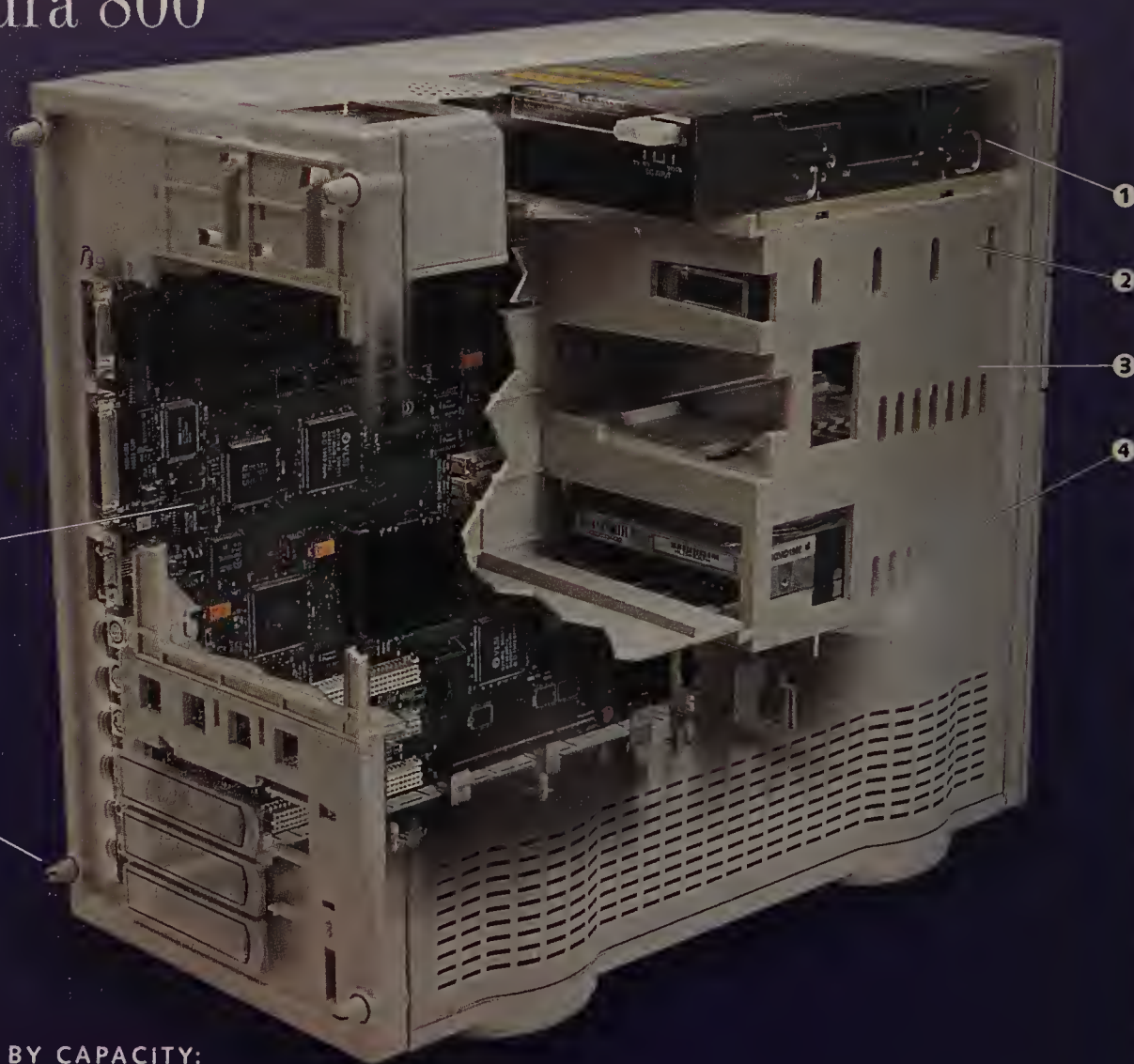
The Quadra 800 shares the same memory architecture as the Centris 650, which means that the 800 offers two benefits over earlier Quadras. One benefit is

Inside the Quadra 800

The logic board faces inward, so you must swing it out after removing the case, making RAM upgrades and NuBus board installation awkward.

The logic board is less dense than that of earlier Quadras because fewer, more-integrated chips are used.

Casing screws remove easily to reduce effort for installation of drives, board, and RAM.



DRIVE BAYS BY CAPACITY:

(Face plates cover the top three bays when empty.)

- ① Half-height 5¼-inch drive
- ② Half-height 3½-inch drive (usually floppy)
- ③ Half-height 3½-inch drive
- ④ One full-height or two half-height 3½-inch drives (not accessible for removable media)

that you need no longer worry about memory-placement rules. You can put any capacity SIMM into any slot, and you need no longer fill more than one slot at a time—fill as few or as many slots as you wish with any supported SIMMs you have. Gone are rules like how many slots must be filled to make a bank and what capacity SIMMs must go in which bank.

The other benefit is that, through a trick called *interleaving*, the Quadra 800's processor can access RAM about 10 percent faster in some cases. This happens if you have two SIMMs of the same capacity in neighboring slots; the memory circuitry, in effect, combines the two SIMMs, writing data simultaneously to both, which lets the processor deal with larger chunks of data in the same period of time than it could handle without interleaving. Keep in mind that the performance gain of memory interleaving will not happen with everyday programs—they don't use memory in large chunks consistently enough for the memory-interleaving advantages to come into play.

Expansion Options The Quadra 800 offers three NuBus slots and a Processor Direct Slot, or PDS (which accepts standard Quadra PDS boards). That's one more NuBus slot than the Quadra 700 offered and two less than the 950 offers. As in other Macs, the PDS is behind a NuBus slot, so these two slots can't be used simultaneously because a board in one slot covers up the other. There are also the standard two serial ports, two ADB ports, and one SCSI port, plus mono sound-in and stereo sound-out ports using the same stereo circuitry that's found in the Quadra 950. The addition of raised plastic icons on the side of the tower's case to help you more easily find these ports is a nice touch.

The Quadra 800 drops the dual SCSI-port implementation that the Quadra 900 and 950 offered. The Quadra 900 and 950 have one high-speed internal SCSI port and one high-speed external SCSI port. (The total number of SCSI devices is still limited to seven.) This gives those Quadras the ability to take advantage of some kinds of fast hard drives to gain very fast data transfer. One way to take advantage of this is to connect one drive to the internal SCSI port and a second drive to the external SCSI port. In this configuration, data can be written to and read from both drives practically simultaneously, making overall data transfer faster. But few vendors take advantage of this; most vendors offering these types of RAID (redundant array of independent drives) systems provide their own hard drive controller—one that transfers data even faster than the

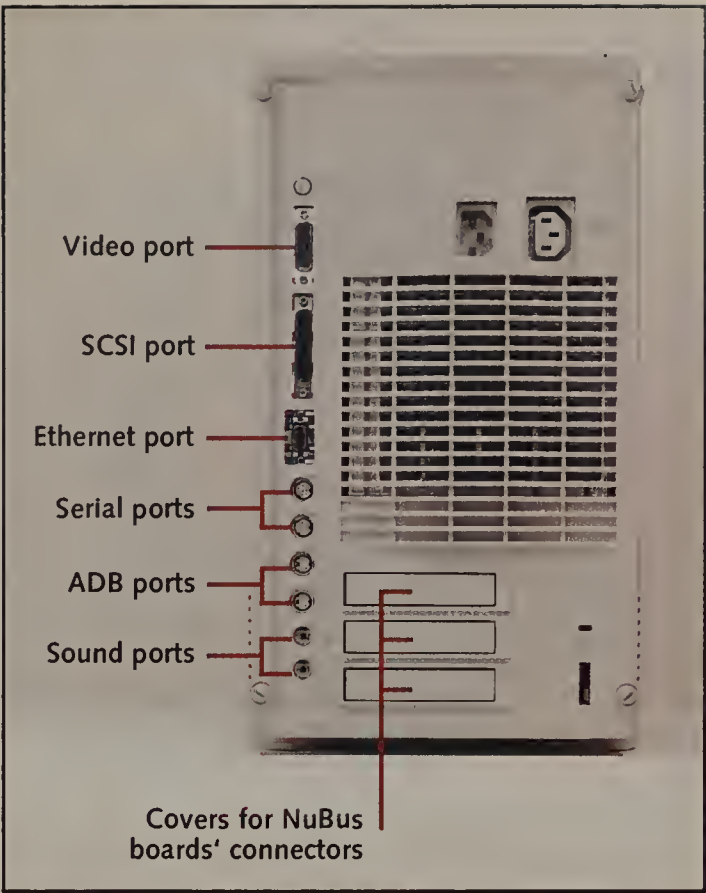
Quadra. The fact that Apple dropped dual SCSI ports in the Quadra 800 acknowledges that their advantages were minimal for most users, and the cost of implementing the dual ports was more than it was worth.

Apple includes Ethernet on the Quadra 800's logic board for all configurations sold in the U.S. Elsewhere, Ethernet may be optional or require an add-on board or SCSI box.

To power all these expansion options as well as internal drives, the Quadra 800 comes with a 200-watt power supply, which should be adequate. The 950 has a 300w supply, which is an advantage if you simultaneously use an assortment of power-consuming options, like very-high-capacity drives, combination video-display and video-capture boards, and multiprocessing boards. The Quadra 700 has a small, 95w power supply. Like the new Centris Macs, the Quadra 800 does not allocate a fixed amount of power to each NuBus slot; instead, it sends as much as each device needs, up to the total amount of power available for NuBus. Apple says it tested boards that draw as much as 15w without difficulty. A typical accelerator or 24-bit video-display board uses between 8w and 12w.

Storage Options With the Quadra 800, Apple is also introducing two high-capacity, high-speed drive options—500MB and 1GB—that are perfect for the byte-hungry database, video, audio, and image files Quadra users typically work with. The standard configuration for the Quadra 800 is a 230MB drive, which is larger than the standard 80MB and 160MB drives shipped with the original Quadra 700 and 950, respectively. (The 230MB drive is now the basic configuration for the Quadra 950, although Apple also sells a configuration with no internal drive.)

One of the most useful features of the Quadra 800 is the accessibility of its internal drives. The 800 has bays for four drives, and three of them have removable front panels, so you can use them for removable media like CD ROM, tape, SyQuest, and floppy drives. That's a lot more accessibility than the



Back Panel Up Close The back panel of the Quadra 800.

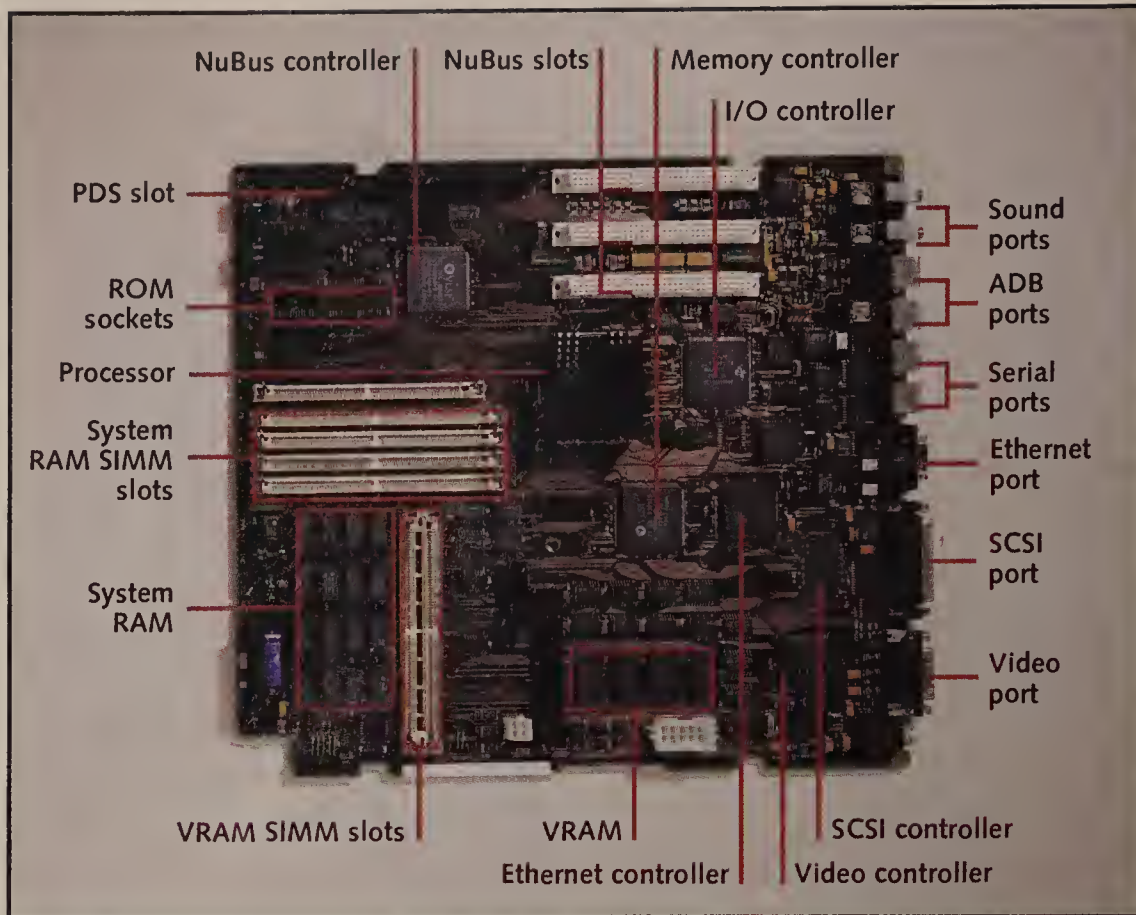
QUADRA PRICE COMPARISON				
Model	List Price	RAM	VRAM	Hard Drive Capacity
Quadra 950	\$6099	8MB	512K	230MB
	\$6849	8MB	512K	500MB
	\$8149	16MB	512K	1GB
Quadra 800	\$4676	8MB	512K	230MB
	\$5429	8MB	512K	500MB
	\$7199	24MB	1MB	1GB
Quadra 700	\$4219	4MB	512K	none
	\$4669	4MB	512K	80MB
	\$5039	4MB	512K	230MB
	\$5849	4MB	512K	400MB

Prices are Apple's expected list prices at the Quadra 800's product introduction. Dealers may offer other configurations. All configurations include Ethernet, a SuperDrive, and a mouse.

earlier Quadras offer: the 950 has two accessible bays and the 700 has none.

The Quadra 800's top bay holds a half-height 5¼-inch drive, such as a CD ROM, SyQuest, or optical drive. The two bays below each hold a half-height 3½-inch drive, like a SuperDrive, some optical drives, or a low-capacity tape drive. The fourth bay, which is not accessible from the front panel, holds one full-height or two half-height drives. (The 230MB and 500MB hard drives are half-height drives, while the new 1GB drive is a full-height drive.) The inaccessible bay is meant to hold a hard drive; the Quadra 800 comes with options for a 230MB, 500MB, or 1GB drive. You could also put another vendor's drive in the bay.

With the three accessible bays that hold one drive each and the one inaccessible bay that can hold up to two drives,



The Quadra 800 Logic Board The board uses chips that combine functions that previous Macs had implemented via several chips. The memory controller combines system RAM and video RAM management, the NuBus controller integrates all NuBus management, and the I/O controller manages basic system input/output functions, including those for floppy-drive and sound management. The unlabeled slot near the system RAM SIMM slots is used during development and is not included in the final boards.

you might think you could install five drives in a Quadra 800. You can't, since there are only four SCSI connectors inside the Quadra. Still, the setup of the Quadra 800's four bays gives you great flexibility in what kinds of drives you can install—it's well thought out.

The Quadra 800's maximum capacity of four internal devices compares favorably with both the Quadra 700's two and the 950's four (see "Macintosh Quadras Compared"). The chief differences are that the 700's drives have to be slim, since the 700 supports only third-height 3½-inch devices, while the Quadra 950 supports four 5¼-inch half-height devices (compared with the 800's one) and—unless you build a mounting bracket—no 3½-inch half-height device (compared with the 800's three). The 800 is clearly more capacious when compared with the 700, but not so clearly when compared with the 950. The difference is the type of drive supported—if you need multiple 5¼-inch internal devices, the 950 is the only choice. Otherwise, it's a toss-up.

As it does for the new Centris Macs, Apple offers a CD bundle that includes an AppleCD 300i CD ROM drive and a CD with System 7.1. This adds about \$400 to the price. You can restart the Mac and reinstall the System onto the hard drive from the CD should the drive ever fail.

Apple has enhanced how SCSI termination works for internal devices in the

Quadra 800. First, a refresher on SCSI rules: each end of a SCSI chain must be terminated. One end of the chain is the internal hard drive, which usually has its own termination built in. The other end is the last external SCSI device.

The Quadras support multiple drives internally, so the SCSI chain starts inside the Mac. The same rules apply: the first drive on the internal part of the chain (the one at the end of the SCSI ribbon) must be terminated, while the others should not be. If there are no external SCSI devices, you should not terminate the last internal SCSI device, since you'd block the SCSI connection between the logic board and the internal SCSI chain. In earlier Quadras, you put a terminator on the logic board to end this internal SCSI chain. In the Quadra 800 the logic board automatically terminates the last internal SCSI device if there are no external SCSI devices.

Video Support With Apple's desire to make 16-bit color depth (32,768 colors) the standard for high-resolution display, it's no surprise that the new mid-range and high-end Macs—the Quadra 800 included—offer 16-bit video support for monitors as large as 16 inches. To get that color depth, however, requires adding 512K of video RAM to the logic boards' built-in 512K of VRAM.

With the basic 512K, you can drive monitors from 12 to 16 inches at 8-bit

color depth (256 colors). With the full 1MB of VRAM, the Quadra 800 drives a 19-inch or 21-inch monitor at 8-bit color depth. If you want more color depth for such large monitors, you need to buy a separate video-display board.

This maximum of 1MB of VRAM is less than the Quadra 700's (and Quadra 950's) 2MB maximum, which supports 24-bit color on monitors as large as 16 inches. For many types of work, 16-bit color is sufficient, and for Apple it is less expensive than adding the VRAM and circuitry required to support 24-bit color. Users still have many good choices of third-party 24-bit boards.

Apple engineers have also tweaked how the Quadra 800 handles video processing. Like the previous Quadras, the 800 uses the 68040 processor to translate QuickDraw commands into the images you see on screen. But the 800 uses the 040 more efficiently on some operations, moving video data from the processor to VRAM in 16-byte chunks rather than in 4-byte chunks. That should particularly speed up vertical scrolling and solid fills, Apple says, because those operations tend to result in more raw data being generated than other common display-altering operations, like changing typefaces or inserting text.

Like the new Centris 610 and 650, the Quadra 800 supports DOS VGA and Super VGA monitors at common video-signal timings, letting it drive most VGA and Super VGA monitors at 640-by-480-pixel and 800-by-600-pixel resolutions, as well as monitors that support SuperMac timing at 1024-by-768-pixel resolution (most Super VGA multisync monitors do). However, you need a separate Mac-to-VGA adapter for each resolution because of how the Mac senses what resolution to drive the monitor in. (The Mac defaults to the 14-inch standard of 640-by-480 resolution unless the Mac-to-VGA adapter explicitly reconfigures the sense pins in the Mac's video port to a setting the Mac recognizes as being a higher resolution.)

Price For a workstation-level Macintosh, the Quadra 800 is surprisingly inexpensive. The base configuration—8MB of RAM, 512K of VRAM, and a 230MB hard drive—has a list price of \$4676. The midrange configuration—with 512K of VRAM and a 500MB hard drive—costs \$5429, while the high-end configuration—24MB of RAM, 1MB of VRAM, and a 1GB hard drive—costs \$7199. (For all configurations, the monitor and keyboard are extra but the newly redesigned Apple mouse is included.)

Because of the Quadra 800's aggressive pricing, Apple plans to lower the

Quadra 800 Performance

Times are in seconds. Shorter bars are better.

Processor Tasks

We ran several tests that show how the different processors perform. Our tests included adding and subtracting numbers and finding a word, which depend mainly on the speed of the processor.

Drive-Access Tasks

We ran tests that show how well each Mac performs on tasks that rely heavily on the hard drive. Our tests included opening and saving files, which require the processor to work with the hard drive.

Display Tasks

We ran several tests that show how well each Mac performs on tasks that depend heavily on the speed of screen redraw. Our tests included scrolling, which requires the processor to work with the display circuitry.

Math Tasks

We ran several tests that show how quickly math coprocessors of various speeds perform. Our tests included recalculations that involve scientific functions, which depend heavily on a math coprocessor.

Macintosh Quadra 800	69	138	29	70
Macintosh Quadra 950	74	144	35	76
Macintosh Quadra 700	95	172	41	96

The Quadra 800 outperforms the Quadra 700 by a wide margin in all of our tests. Even more significantly, the Quadra 800 outruns the high-end Quadra 950 in most individual tests, although not by much.

price of the 950 considerably—by more than \$1000 for each configuration when compared with the list prices in effect as we went to press. After the new Quadra 950 prices take effect, the 8/230 model will list for \$6099, the 8/500 model for \$6849, and the 16/1GB model for \$8149. At press time, Apple had no plans to lower the Quadra 700's prices. To put these prices in perspective, the Quadra 800 will cost about the same as a comparably configured Quadra 700 and \$1500 less than a comparably configured Quadra 950.

More Integration

TO PACK THE QUADRA 950'S LEVEL OF performance into the 800's smaller box, Apple greatly miniaturized and consolidated the 800's logic-board components. Apple engineers took ten special circuits called ASICs (application-specific integrated circuits) and combined many of their functions. The result is a set of three ASICs that do what ten used to do. (The three ASICs handle memory [both system and video RAM], input/output management, and NuBus.)

This miniaturization is really obvious if you put a Quadra 800's logic board next to a 700's. The boards are the same size, and the Quadra 800 offers more power, so you might expect the 800's board to be cluttered with components. You'd be wrong. The 800 looks empty by comparison. All that empty space used to be occupied by circuitry; now that circuitry has been miniaturized or consolidated.

Miniaturization and consolidation do more than free up logic-board space—they let computer designers create more-efficient systems. For example, the integration of all the memory functions on one ASIC lets the memory on the Quadra 800 operate faster than on previous Quadras because there is no slowdown as various components exchange informa-

MACINTOSH QUADRAS COMPARED				
	Centris 650	Quadra 700	Quadra 800	Quadra 950
List price (base model)	\$2699	\$4669	\$4676	\$6099
RAM/hard drive capacity (base model)	4MB/80MB	4MB/80MB	8MB/230MB	8MB/230MB
Processor	68LC040*	68040	68040	68040
Processor speed	25MHz	25MHz	33MHz	33MHz
Math coprocessor	optional*	included	included	included
Base RAM	4MB or 8MB	4MB	8MB	8MB
Maximum RAM	132MB or 136MB	20MB	136MB	64MB
Base VRAM	512K	512K	512K	1MB
Maximum VRAM	1MB	2MB	1MB	2MB
Number of NuBus slots	3	2	3	5
Number of Processor Direct Slots	1	1	1	1
Hard drive capacities	80MB, 230MB, 500MB	80MB, 160MB, 230MB	230MB, 500MB, 1GB	230MB, 500MB, 1GB
Ethernet	optional*	included	included	included
Total internal bays	2	2	4	4
Accessible 5¼-inch bays	1	1	1	0
Inaccessible 5¼-inch bays	0	0	0	2
Accessible 3½-inch bays	1	1	2	2
Inaccessible 3½-inch bays	0	0	1	0

* All configurations other than the base model use a regular 68040, which has a built-in math coprocessor, and include Ethernet.

tion. Likewise, the input/output system, which directs the Mac's communication with peripheral devices along the logic board's bus, is now combined into one ASIC on the Quadra 800. The I/O bus and the system bus are now synchronous, thus eliminating the delays that occur in previous Quadra designs.

Comparing the Quadras

DESPITE THE ADVANCES IN THE QUADRA 800, the Quadra 950 retains the mantle of most-powerful Mac, thanks to the 950's faster SCSI and Processor Direct Slot (which lets some drives and add-in boards perform faster), as well as to its greater number of NuBus slots (five ver-

sus three). But in terms of computation ability, the Quadra 800 and Quadra 950 are about evenly matched.

In some ways, however, the Quadra 800 offers more than the 950 does: memory can be expanded to 136MB (compared with 64MB in the 950), three drive bays are accessible from the front panel (compared with two in the 950), and it supports restart from the AppleCD 300i CD ROM drive (the 950 doesn't). These considerations, plus aggressive pricing, make the Quadra 800 the mainstream choice for high-end users. **m**

Macworld Lab testing supervised by MARK HURLOW and TIM WARNER.

COLOR POWERBOOK

The PowerBook 165c has 256 colors—
but the view isn't always a rosy one

*Color is the theme of Apple's
latest product introductions. But
the company has gone a bit too
far, too fast in introducing a color
PowerBook. The price for the
PowerBook 165c is fair, and the
machine has solid performance,
but the passive matrix screen just
isn't alluring enough to make
this laptop a "must buy." I'd
rather wait until an active
matrix display is available (and
affordable) before buying in.*

WHEN MOST OF US GO TO A STORE TO buy a Mac, we walk over to inspect the Quadras and high-end PowerBooks—to dream a little—before plunking down our hard-earned money to buy a Classic, LC, or some other Macintosh that is truly affordable. At least we can get a glimpse of the future—even our own future—as the high-end Macs of today become the mainstream Macs of tomorrow.

But Apple's first color PowerBook features the technology of the recent past rather than the promise of tomorrow. The PowerBook 165c is a competent laptop computer—it has the same 68030, 33MHz CPU, and 68882 math coprocessor as the PowerBook 180, and retails for only \$3399 with an 80MB hard drive and \$3759 with a 160MB hard drive. Its reception will depend entirely on a single component—its color, passive matrix LCD screen, a screen technology that was introduced in DOS-based computers almost two years ago. That's passive and dim, rather than the brilliant, sharp images offered by the significantly-more-expensive active matrix color LCD screens available for some DOS laptops and as a retrofit for some PowerBooks (for the differences between passive matrix and active matrix screens, see "Crystal-Clear Presentations," *Macworld*, January 1993).

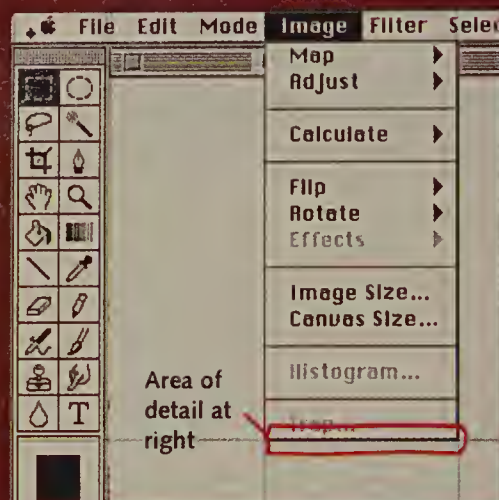
Apple certainly plans to offer a color PowerBook with an active matrix screen

B Y C A R Y L U



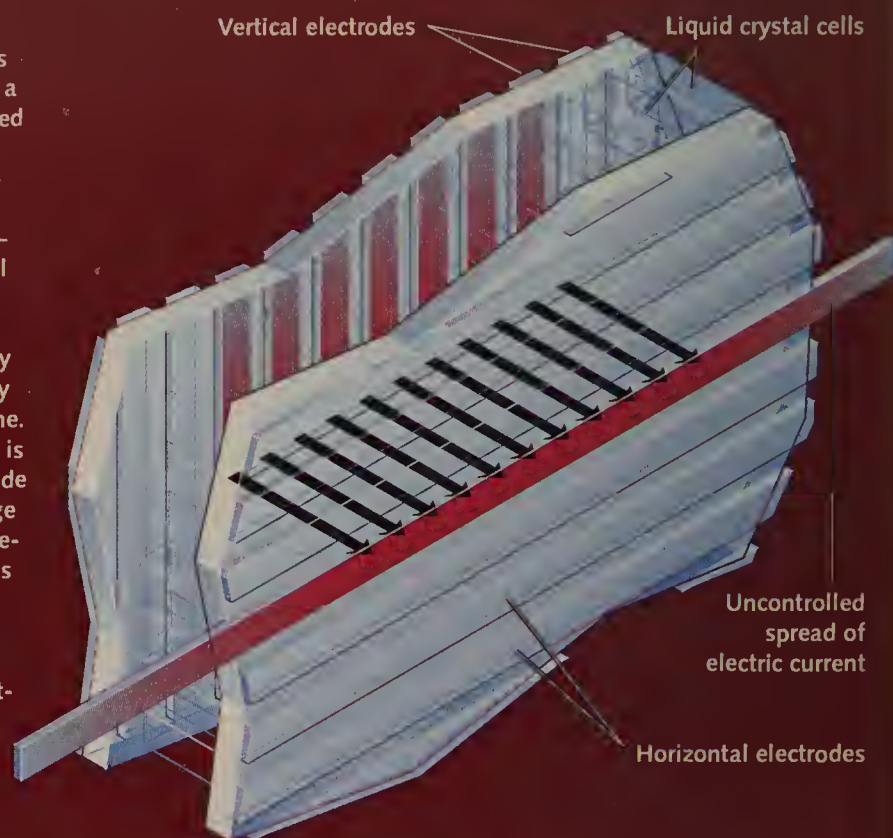
What Causes LCD Shadowing?

Passive matrix LCD screens, such as that used in the PowerBook 165c, commonly suffer from *shadowing*, sometimes called *ghosting*. This term describes a faint continuation of solid lines—sometimes darker, sometimes lighter—beyond the end of those lines, as shown below.



Shadow images derive from an uncontrolled spread of electricity along the electrodes that turn screen pixels on and off. To darken a pixel, current (indicated by the black arrows) must pass from a vertical electrode to a horizontal electrode—the liquid crystal pixel is turned on in the space between those electrodes, where they would intersect if they were in the same plane. When a row of pixels is turned on, the electrode cannot hold the charge (red sections) accurately. The current spreads into adjacent areas along that electrode, partially turning on those pixels and creating a shadow image.

Detail of LCD Screen



—probably before long. The Macintosh has to remain competitive with DOS laptops, and at the Comdex computer show last November, a flood of active matrix, color DOS portables appeared, not only from the major manufacturers but also—for the first time ever—from many small Asian companies.

The PowerBook 165c lacks excitement, but it does make some marketing sense—as a cost-effective mass-market product.

Screen Problems

THE POWERBOOK 165C'S SCREEN IS THE color equivalent of the gray-scale passive matrix screen in the PowerBook 160, although the 165c's screen is slightly smaller, 8.9 inches diagonally instead of 10 inches. The display shows 256 colors out of a palette of 4096 colors, sufficient to support ColorSync, Apple's method of matching screen colors with printed and scanned colors (see "Managing Color," *Macworld*, January 1993). Apple deemed 16-bit color unnecessarily expensive for a mainstream color product like the PowerBook 165c. In fact the 165c's standard 256K of video RAM cannot be expanded.

Passive matrix LCD screens have a variety of image defects that active matrix screens avoid. It takes time (*response time*)

to change a pixel's color, so moving objects leave a ghost trail. The trail left by a cursor isn't usually a big problem, but ghosting in a QuickTime movie gives images a smudged quality. *Submarining*, the disappearance of the cursor during a rapid move, is controlled fairly well in the PowerBook 165c. Sharp, the Japanese maker of the screen, has gotten response time down to 400 milliseconds—pretty good for a color display, although gray-scale passive matrix displays respond in 250ms and all active matrix displays respond in under 100ms. So people accustomed to a gray-scale screen may be disappointed in this regard.

The PowerBook 165c continues a PowerBook tradition with a 640-by-400-pixel screen, 80 pixels short of the standard 640-by-480 screens used by desktop Macs and nearly all DOS laptops. The short screen might have had some justification in past years as a space-saving measure. It's now an anachronism, especially on a color display. Many multimedia titles are designed for at least a 640-by-480 screen. When necessary, all PowerBooks clip the bottom 80 pixels off full-screen 680-by-480 images.

The horizontal and vertical scanning process used by the 165c produces vertical and horizontal shadows that spread out from any large dark region or the

edges of well-defined rectangular objects, such as a window frame (see "What Causes LCD Shadowing"). The shadows, most easily seen against a light background, also distort colors. To save money, Sharp built the 165c display with a single scanned panel. Designers frequently divide passive matrix displays into two independent panels to minimize shadows and improve contrast; that's why the shadowing stops in the middle of the screen on monochrome and gray-scale PowerBooks with passive matrix displays.

Under optimum lighting conditions—that is, no ambient light at all—the passive matrix screen shows its colors reasonably well. The viewing angle is surprisingly wide for a passive matrix design, but for the most part only one person at a time can look at the screen. The colors look mottled compared with colors on a standard Macintosh display because the LCD pixels do not have as smooth a brightness range. On the other hand, all LCD screens show perfect geometry, unlike CRTs, which exhibit many distortions. And LCDs are nearly free of electromagnetic emissions. In the long run—a period that may stretch into decades—LCDs will probably replace CRTs even on desktop computers.

In their current form, color LCD screens—whether passive matrix or active

The 165c tips the **scales** at 7 pounds, but if you want to carry enough batteries to work **throughout** a transcontinental **flight**, the 165c will weigh 10 pounds

matrix—work somewhat less well than their monochrome and gray-scale cousins. The color filters reduce the overall brightness considerably.

To overcome the dimming effect of the color filters, Apple uses two fluorescent backlights in the PowerBook 165c; all previous PowerBooks have just one backlight. Still, the color filters render the screen unusable outdoors in daylight because the backlighting isn't strong enough to overcome ambient light. All the monochrome PowerBooks work acceptably outdoors even without backlighting; the screens are translucent enough and the backing reflective enough to produce a usable image.

Even one backlight is a major drain on battery power, however, and the second backlight drives Apple's estimate for battery life down to one and a half to two hours for the PowerBook 165c. Macworld Lab tests indicate that you'd be lucky to get one full hour of continuous use. By comparison, the PowerBooks 160 and 180, which use the same battery, are rated for two and a half to three hours.

To meet the additional power requirement, the 165c comes with a higher-power AC adapter, a 24-watt unit that is also compatible with and will eventually replace earlier PowerBook 100-series AC adapters. The power requirement creates the one area where the PowerBook 165c is partially or completely incompatible with earlier PowerBook accessories—power adapters and some third-party battery packs. Apple supplies a 2.9-ampere-hour nickel-cadmium (NiCad) battery pack for the 165c, replacing the 2.8Ah battery introduced with the PowerBooks 160 and 180, which replaced the 2.5Ah battery

that originally shipped with the 140, 145, and 170. (Ampere hour is a common measure of battery capacity.) All the batteries are the same size and interchangeable; but for the power-hungry 165c, you should stick to the 2.8Ah or 2.9Ah batteries. Similarly, you should use the 24w AC power adapter rather than the earlier 15w and 17w adapters. The 24w adapter works with earlier PowerBooks and batteries (except for the Duos).

The 165c tips the scales at 7 pounds, only 0.2 pounds heavier than the 160 or 180, so in a key trade-off, Apple chose weight over battery life. If you want to carry enough batteries to work on a transcontinental flight, however, the 165c will weigh 10 pounds, that's with three spare batteries; a 160 with one spare battery weighs 7.8 pounds.

As for size, the color LCD is thicker than the monochrome variety, but com-

pared with a 160 or 180, the 165c is barely 1.2mm thicker—about the thickness of a quarter.

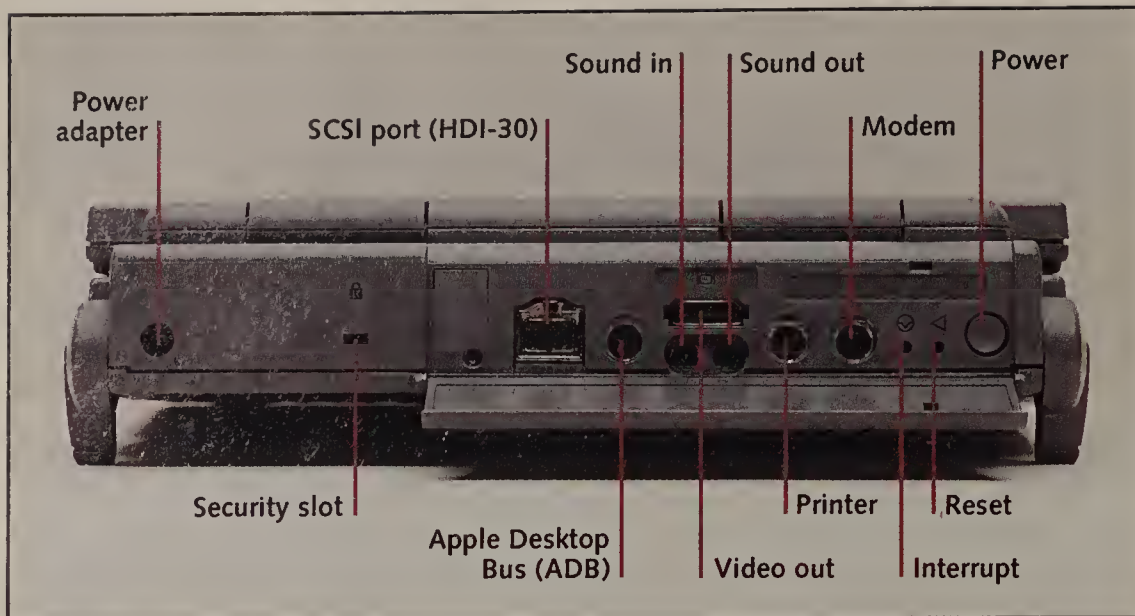
Beyond color, the PowerBook 165c combines the 160's passive matrix screen technology with features of the 180. The CPU is a 33MHz 68030 with a 68882 math coprocessor, just like that of a 180. The 165c performs at the level of a 180, except for a slowdown when processing information for 256 colors. The video circuits are straightforward and without acceleration, but are certainly fast enough to run QuickTime movies adequately, aside from the smudging problem described earlier.

Memory: RAM and Disk

THE 165C HAS 4MB OF PSEUDOSTATIC RAM soldered in and accepts up to 10MB more of expansion memory for a total of 14MB, using the same expansion



Driving an External Monitor Like the PowerBook 160 and 180, the 165c has a video-out port for driving an external monitor. The external monitor can show the same image as the 165c, or an alternate image.



Hidden Ports The back of the PowerBook 165c contains the standard Apple ports, connectors, and switches. All are hidden behind a flip-down panel.

boards as the 160 and 180. The same speed issues apply as well; the optimum 85-nanosecond RAM runs at full speed, the 100ns RAM sold for the PowerBooks 100, 140, 145, 160, and 170 slow the computer down about 10 percent. Check large expansion memory boards for physical compatibility with the PowerBook 165c before you buy any of them.

Apple will ship the 165c with either an 80MB or a 160MB hard drive, and the computer will accept any PowerBook-compatible 2.5-inch hard disk drive. Drives with 240MB are available today; 500MB drives should be available by fall of 1993. Hard drive performance is decent, with a transfer rate of about 1MB per second—comparable to the performance of midrange desktop Macs. (High-performance hard drives are unlikely to appear in a battery-operated computer because their higher clock speeds and faster disk rotation consume much more power.) The built-in 1.4MB floppy drive (SuperDrive) is the same as on other PowerBook models.

External Video

THE 165C, LIKE THE 160 AND 180, HAS built-in video circuits to drive a range of monitors. The video circuits, which have their own video RAM, will drive all standard Macintosh external monitors from 12-inch RGB (256 colors) to 16-inch RGB (256 colors) and full-page portrait displays (16 grays). In addition, the 165c drives common VGA (640 by 480 pixels) and SuperVGA (800 by 600 pixels) monitors sold for use with IBM PC compatibles, although only at the flicker-prone vertical refresh rates of 60Hz (VGA) and 56Hz (Super VGA). Macintosh monitors run at their normal flicker-free refresh rates of 66.7Hz or higher, except for the 12-inch RGB monitor, which runs at

60Hz. The video-out circuit uses the same high-density video connector as the 160 and 180.

The external monitor can mirror (duplicate) the LCD screen, which is handy if you want to use the 165c to control a large CRT or projection panel in a group presentation. In mirror mode, the external screen shows the same 640 by 400 pixels as the built-in screen; any remaining pixels on the external screen are blacked out. Or you can juxtapose the external monitor with the built-in screen; in this mode each screen shows a separate image and the main menu bar can go on either screen.

An internal modem slot accepts both the older modems designed for the PowerBooks 100, 140, 145, and 170 as well as the newer Express modems developed for the 160, the 180, and the Duos. (At press time, Apple was considering selling a version of the PowerBook 165c with 4MB of memory, a 160MB hard drive, and an Express modem for about \$4000.) Other familiar connectors making a return appearance are two serial ports, an ADB port, a SCSI port, and sound-in (mono) and sound-out (stereo) ports. All of these connectors and ports are protected by a panel that you flip up in order to gain access. A microphone is built into the case between the keyboard and display.

Ergonomics

THE 165C'S SCREEN (8.9-INCH DIAGONAL) is nominally smaller than the Duos' (9-inch) and appreciably smaller than a 160's (10-inch). The width of each color triad (red, green, blue) is 0.3mm, or 84.7 dpi. While the 84.7-dpi resolution contributes to a sharper-looking image, it differs enough from the resolution of a standard desktop Macintosh display (75 dpi; the PowerBook 160 is 77 dpi) that if you

work with both built-in and external displays, you might have some difficulty switching back and forth. When you roll a trackball or move a mouse, you use feedback from your eyes along with your muscles to control movement; this difference in resolution can be disconcerting for precise work.

The keyboard is identical to other 100-series PowerBooks' keyboards. A two-level tilt adjustment sets the keyboard at a 5-degree or an 11-degree angle for more comfortable typing.

Mechanical Design

INTERNALLY, THE 165C DIFFERS FROM the 160 and 180 because of the extra circuitry necessary for the color display. The earlier PowerBooks contained two circuit boards—a main logic board and piggyback board holding the CPU, ROM, and soldered RAM. To accommodate the extra circuitry required for color, the 165c moves the ROM and soldered RAM to a second piggyback board.

Like the 160 and 180, the PowerBook 165c has molded into its case the small security slot originally designed by Kensington. A few security products connect with this slot to try to prevent computers from disappearing.

System Software

THE 165C RUNS UNDER SYSTEM 7.1 with an extension (which Apple calls a system enabler) that invokes special features of the PowerBook 165c: optimized controls for power conservation in the PowerBook 165c control panel; the ability to dim or shut down both the internal and external display; and of course, the Colors control panel and the number-of-colors choice in the Monitors control panel, which are active for the first time in a PowerBook internal display.

Alternatives

THE POWERBOOK 165C WITH 4MB OF RAM and an 80MB hard drive is likely to sell on the street for roughly \$3000 to \$3400. Is it worth it? Let's consider some alternatives.

You could buy a PowerBook 160 and connect an external color monitor when you need color; the total price would be about \$2600. Obviously you won't get a color display on the PowerBook, but you will get an LCD display with fewer disadvantages, as well as good-quality color on the CRT.

If you travel by car and want a relatively compact Mac to show high-quality color images to small groups, the Color Classic (see "Color Classic," in this issue) may suffice; it is certainly cheaper than any PowerBook solution.

As an **alternative** to the 165c, you could buy a DOS color laptop. But none of the DOS **laptops** have the ergonomic design of a **PowerBook** or the built-in networking.

Newer Technology has demonstrated an active matrix LCD upgrade for a PowerBook 140, 145, or 170. Although the company has not committed to definitely selling a product, it anticipates that the upgrade would cost about \$3000 and include 6MB of expansion RAM and an external video connector. Newer Technology's 9-inch-diagonal screen, which is made by Sharp, displays 256 colors (from a palette of 32,000 colors) with 640 by 480 pixels rather than Apple's 640 by 400 standard. The screen fits without modifying the PowerBook 165c's case because it is 96 dpi, noticeably finer than any common Macintosh display.

To save circuitry space, the external video connector supports only 640-by-480-pixel monitors, either Macintosh-type or VGA, and only in mirror mode. From a cost standpoint, the PowerBook 145 is the best choice for this type of upgrade because it has the performance of a 170, but wouldn't force you to throw away a 170's active matrix black-and-white screen. Since the PowerBook 145 sells for about \$1900, the total price would come to an estimated \$5400. After you install the Newer Technology upgrade, the PowerBook will be maxed out from the RAM standpoint, and you may

need to replace the AC adapter to cope with the power demands of the Sharp screen's two backlights. Newer recommends extended-life battery packs.

Newer also plans a passive matrix color upgrade for the 140, 145, and 170. Before you upgrade, compare the costs against selling your current PowerBook and buying a 165c; remember that the 165c comes with higher performance, more RAM capacity, and more-flexible external video output.

Considering DOS

YOU COULD ALSO CONSIDER A DOS color laptop. DOS laptops cost roughly 20 percent less than PowerBooks, although exact comparisons are hard. The cheaper DOS passive matrix color laptops go for about \$2500, and some display only 16 colors rather than 256. A DOS laptop with an active matrix color display starts at about \$3500 for a 16-color display, about \$4000 for 256 colors. For the extra money, you do get a good display but you'd still face all the other limitations and costs of a DOS laptop.

A capable DOS laptop running Microsoft Windows does a good job, and many major applications, from FileMaker Pro to PageMaker, work essentially

identically on PCs and Macs. Thanks to Apple's SuperDrive, you can exchange files via floppy disk with little trouble. Then again, none of the DOS laptops have the ergonomic design of a PowerBook or the built-in networking. And the killer is the cost of buying equivalent Windows versions of the software, which would eliminate any savings on hardware.

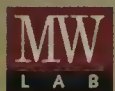
Finally, you can wait for Apple to put out a PowerBook with an active matrix color display. How much will it cost? Perhaps \$1100 to \$1500 more than a 165c. I expect it to cost a little more than today's active matrix DOS laptops, since Apple will probably provide additional features.

I'm inclined to wait. I'd want to see a color active matrix PowerBook and consider the cost and display quality trade-offs—though I might still buy a 165c. Apple might even see a rise in sales of the 165c—as the most cost-effective, workmanlike alternative—after more-expensive color PowerBooks become available.

And the wait shouldn't be long. **m**

CARY LU is a *Macworld* contributing editor and the *PowerBook Notes* columnist.

Macworld Lab testing supervised by MARK HURLOW and TIM WARNER.



PowerBook 165c Performance

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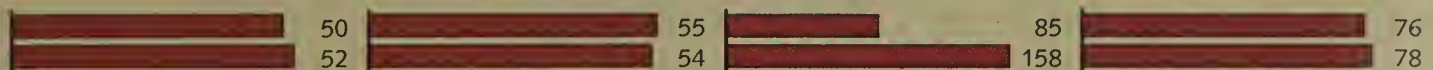
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PowerBook 180
PowerBook 165c



The PowerBook 165c, which uses the same processor and math coprocessor as the 180, shows similar performance in every area except display tasks, reflecting the slower performance expected from a color LCD display, compared to the 180's gray-scale LCD display.

REVIEWS

IN THIS ISSUE: Image Assistant, Adobe Dimensions, Norton Essentials for PowerBook, Cogito, MicroPhone Pro, PowerMerge, Arthur's Teacher Trouble, Super 7 Utilities, and more

Relational Database

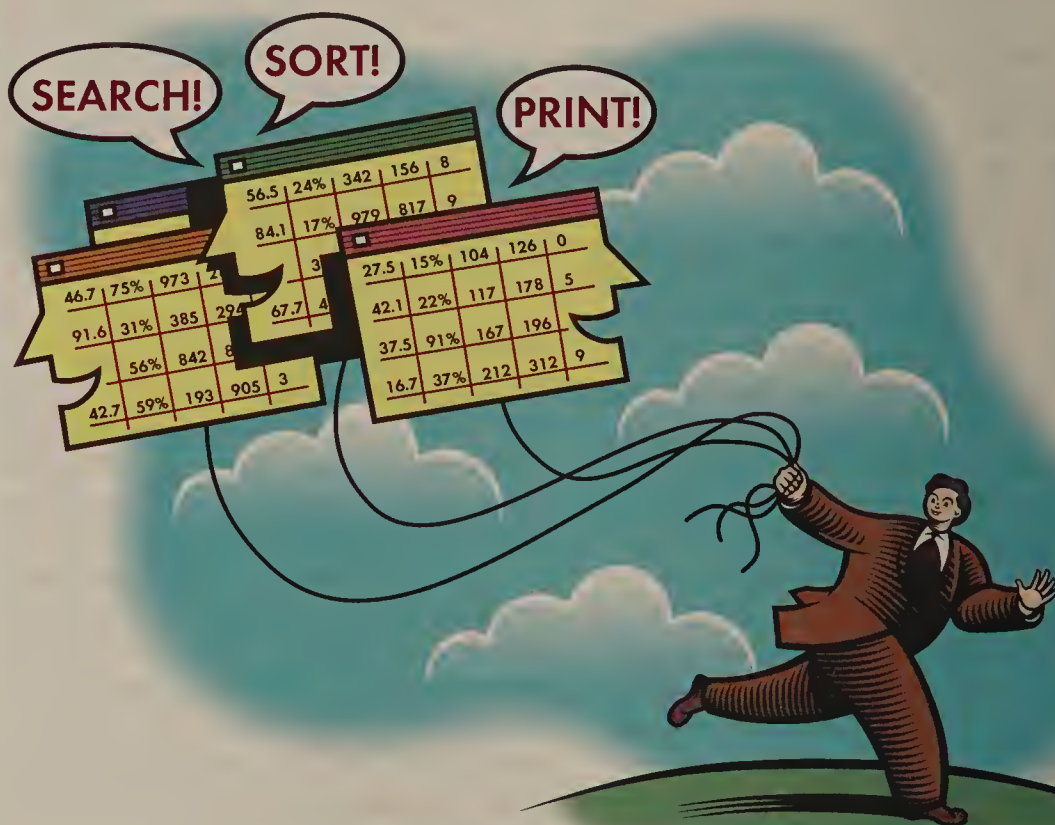
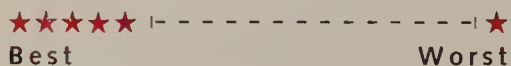
4th Dimension 3.0.1

PROS: True multitasking capabilities; multiple open windows with interprocess communication between windows; improvements in real speed and apparent speed; incremental refinement of interface and language. **CONS:** Connectivity to other databases minimal—these functions part of 4D server. **COMPANY:** ACI US (408/252-4444). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 6.0.7. **LIST PRICE:** \$895.



TO ITS CREDIT, 4TH DIMENSION has survived as a database—and ACI US (the company has redesigned its logo, restyled its manuals, and changed its name from ACIUS to ACI US) has survived as an intact Mac-oriented corporate structure—longer than any of its competitors. The main reason for this is developer loyalty; and the reason the developers are loyal is that, after a significant initial investment in mastering 4D's huge features set, a developer can make reliable and competent database programs that look like real Macintosh applications.

4D has always had plenty of scope—most complaints have focused on speed issues and 4D's learning curve. ACI US has addressed these complaints with three specific moves. First, it introduced 4D Compiler over a year ago to speed execution of procedures in database applications, often by factors of 100. Second, it recently introduced 4D Server, which seriously improves speed and simplifies development of network applications. Finally, the core product, 4D version



3.0.1, includes a long list of programming-facilities enhancements plus multitasking, which produces great speed improvements when used carefully.

Many Tasks Make Light Work

MULTITASKING MAKES THE SINGLE-USER product pretty delightful for both end users and developers. For example, the import of tabbed text files isn't particularly faster than in earlier versions, but a developer can design an application so that file importing, and for that matter report printing, is always done in the background. Similarly, since 4D indexes selected fields as a background activity, with no perceived time penalty, developers can painlessly improve 4D's search speed on large flat files by extensive indexing (see "Lurking"). The time-slice multitasking used in 4D 3.0 means that the program inspects the tasks to be per-

formed in different windows and allocates machine cycles for completing the tasks while keeping the active window "live." In practice this can give the user, in a carefully designed application (and developers report that some experimentation is needed to optimize applications for multitasking), the illusion that all tasks are performed nearly instantly, since the user can usually control the screen right after issuing a command. This aspect of the new 4D also makes most time-honored reviewers' benchmarks misleading, since 4D can now offer applications with perceived speeds comparable to those written for the usual speed champ, FoxBase+/Mac.

Other considerations arise from the change in the internal structure of 4D. For example, developers can switch back and forth instantly from the design environment to the user environment; the old

style, which involved endless closing and opening of windows with numerous attached files, was a major source of tedium in day-to-day practice. While working with a selection of records, you can perform searches and generate reports in independent windows without disturbing your current selection. Because 4D allocates cycle time to processes that can be running simultaneously in different windows, even the single-user version mimics a sort of internal multiuser model, in which processes themselves are the users. This is why, if programmers pay a modicum of attention to the precautions emphasized in the manuals, any single-user application can automatically become a multiple-user application when used with the new 4D Server, which employs the same multitasking scheme.

Goodies

ALTHOUGH THE ATTENTIONS OF LAURENT Ribardi re apparently cannot be turned toward such mundane matters as basic search-engine tinkering, nor can ACI US management be persuaded to offer reasonable ad hoc SQL reports or a bridge to Windows or a compiler in this package (these functions are sold as separate products), the new 4D offers a reasonable assortment of new items beyond multitasking. It's now easier than ever to implement custom help (see "Balloons over the Fields"). Security has been improved: individual users can have different passwords for layouts, creating various levels of access to the same file. Invisibility is a new priority in 4D—you can hide fields, files, and processes for added security. Automatic relations, which used to give sluggish searches on large related files, are now fast enough for use in modest professional applications (the improvement is at least a factor of four). Besides the new commands associated with managing multitask processes, there are now about 20 other commands (PROJECT SELECTION and REDUCE SELECTION, for example) that make shorter procedures possible for most standard business database work. Other new touches include interface features that are a bit overdue: close boxes on windows (!) and floating palettes.

Beginner's Luck

DESPITE 4D'S REPUTATION for complexity, version 3.0 makes a serious effort to deliver its power into the hands of ordinary citizens. The manuals are simply better than



Lurking Underneath the gaudy assortment of active windows you might see in a 4D application, you will find a little indexing window, which tracks automatic background indexing of a database field. (Here the indexing window, showing record 1008, has been brought to the front.) In a well-designed 4D 3.0 application, most tasks that take more than a few seconds can be stuffed somewhere into the background.

anyone else's database manuals—they are no more effort to read than this review. The tutorial has been updated and there's a huge examples file. Although relational database design still takes some contemplation, it's now no more difficult to set up a real application in 4D than it is to construct linked budget spreadsheets in Excel. 4D isn't going to replace FileMaker Pro for users doing simple mailing list merges, but for a multitasking relational database it is impressively easy to use. Strangely enough, with this much more ambitious product, ACI US seems to have succeeded at providing the friendly environment for beginners that the company promised in FileForce.

4D Praises

BY THE TIME YOU READ THIS, EVERY SERIOUS commercial developer of 4D custom applications will have upgraded to version 3.0, and will be singing the praises of 4D Server as well. Multitasking in 3.0 provides not only a remedy for most of 4D's speed deficiencies, but also a great

environment for developing multiuser applications. While 4D's capabilities have been greatly extended, the product is actually easier to use than earlier versions. At its current price, there's some grumbling from developers that built-in assistance with SQL and Windows connections ought to be included, but version 3.0 now offers power features you can't get in any other Macintosh relational database.—CHARLES SEITER

Image-Editing Program

Image Assistant 1.0

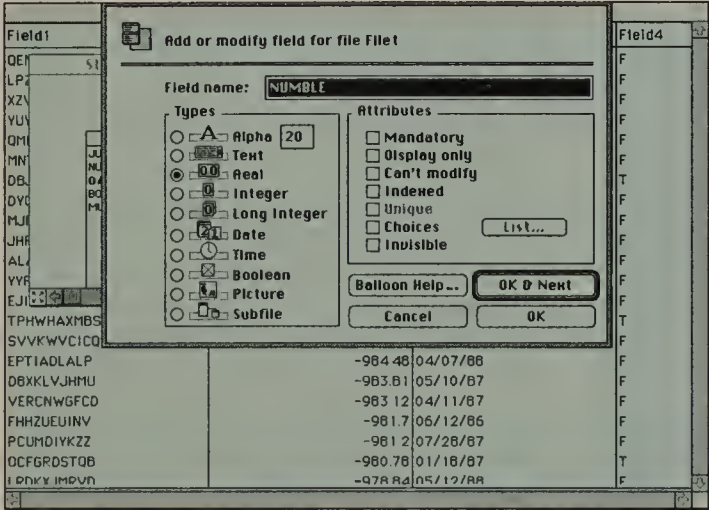
PROS: Assist mode; multiple levels of undo; automated scanning capabilities; prints color separations. **CONS:** Font options limited by text-tool bug; text not antialiased; inadequate selection capabilities; no selective-revert function; nonstandard implementation of smudge tool; doesn't support QuickTime compression or Photoshop plug-in filters; buggy. **COMPANY:** Caere Corporation (408/395-7000). **REQUIRES:** Mac II; 5MB of RAM; SuperDrive; hard drive; System 6.0.7. Recommended: 8MB of RAM; 13-inch color monitor; 24-bit video board; System 7. **LIST PRICE:** \$495.



ALTHOUGH THE MACINTOSH MARKET now has more than 25 commercial paint and image-editing applications, most users still turn to Adobe Photoshop when retouching scanned photos. Casual users, attracted to the world of on-screen photo editing by inexpensive scanners and Kodak's recent Photo CD technology, can be overwhelmed by Photoshop's high price and relative complexity, however. Image Assistant is Caere Corporation's attempt to provide a more affordable, less intimidating program, especially for the new crop of image-editing enthusiasts. Unfortunately, Image Assistant is barely able to keep up with less expensive bitmap editors, most notably MicroFrontier's Color It (also reviewed in this issue).

Easy Come, Easy Go

IMAGE ASSISTANT'S MAIN CONTRIBUTION is the Assist mode, which simplifies the software to its most essential ingredients. In the Assist mode, all menus except File and Edit disappear, and the toolbox dwindles to just ten items. You can retouch an image with paint tools, select and mask portions of the image, add text, sharpen and blur the image via dialog boxes or tools, adjust tone and color—



Balloons over the Fields Notice the Balloon Help option in this dialog box. It lets you tag the fields in the database with custom balloon help, in one of the simplest and most practical help implementations ever produced.

balance settings, and apply special-effects filters—plus you get multiple levels of undo and redo. The filtering and color-balance options bring up thumbnail examples that demonstrate how a range of settings will affect the image. When applying special effects, for example, Image Assistant shows thumbnail results of each of nine filters (see “Try before You Apply”). You can then home in on a single filter to test several variations on the effect. It’s a fine way to get an idea of the outcome of the program’s filtering and color-adjustment features.

But even within Assist mode you encounter rifts in the program’s interface. Foremost among these is that the text tool can access fonts inside the System file only. It ignores fonts opened using font-management utilities such as Fifth Generation Systems’ Suitcase 2.0 and AL-Soft’s MasterJuggler. When you use Adobe Type Manager under System 7.1, Image Assistant entirely overlooks fonts inside the Fonts folder. As a result, many users will have to reconfigure their systems or accept severely curtailed font options. Furthermore, text characters are jagged, not antialiased, as is standard among 24-bit color paint programs from Expert Software’s \$50 Expert Color Paint on up. You can feather selected text to diffuse its edges, but even with 96-point type, the result is fuzzy.

Image Assistant’s selection tools emulate those in Photoshop but are less capable and, ironically, more cumbersome. As in Photoshop and Color It, you can use a selection as a mask, so you can paint inside a specific portion of an image while protecting areas that lie outside it (or vice versa). You can add to a selection by pressing the shift key, but to subtract from it you have to use paint tools to edit the mask, a useful but decidedly counter-intuitive alternative. None of the selec-

tion tools provide automatic antialiasing. Though you can feather selections to soften their edges, the effect is choppy, with incremental bands around the selected image instead of soft, tapering edges. You can’t nudge a selection using the arrow keys—a convenience standard among Macintosh paint programs—and while you can move a selection by dragging it, Image Assistant shows only a rectangular box during the move, too imprecise for most placement procedures. Finally, you can’t delete a selection by pressing backspace, delete, or any other key; you have to choose the Clear command in the Edit menu.

Working without a Net

EXITING THE ASSIST MODE GIVES YOU access to additional color-correction and retouching capabilities. From the expanded toolbox, you can generate two-color gradations; transform an image by scaling, rotating, or flipping it; duplicate portions of an image using a rubber-stamp tool; and smear colors using a smudge tool. Of these capabilities, however, only the gradation tool measures up to its counterparts in Photoshop and Color It; the others all fall short in some way. First, while Image Assistant enables you to scale a selection numerically—a function Photoshop lacks—you must perform all transformations while a dialog box is open, which limits your view of the image and impedes access to the selection handles you must use to perform transformations manually. Moreover, the software offers no skew or distortion feature. Second, Image Assistant’s multiple-undo capability doesn’t excuse its inability to selectively revert portions of an image using the eraser or rubber-stamp tool. And third, the smudge tool smears colors according to the additive color model.

This may sound like a pretty obscure complaint, but even novices will see the difference. Imagine smearing traditional media like finger paints or pastels. The pigments darken as you mix them—green and red mix to form brown, red and blue mix to form violet. Colors smeared inside Image Assistant, however, become lighter and brighter. Green and red mix to form yellow; red and blue mix to form vivid lavender. You get glaring, phony-looking streaks as opposed to deep, transitional blends.

Image Assistant is available on both the Macintosh and Microsoft Windows platforms, so you can trade images

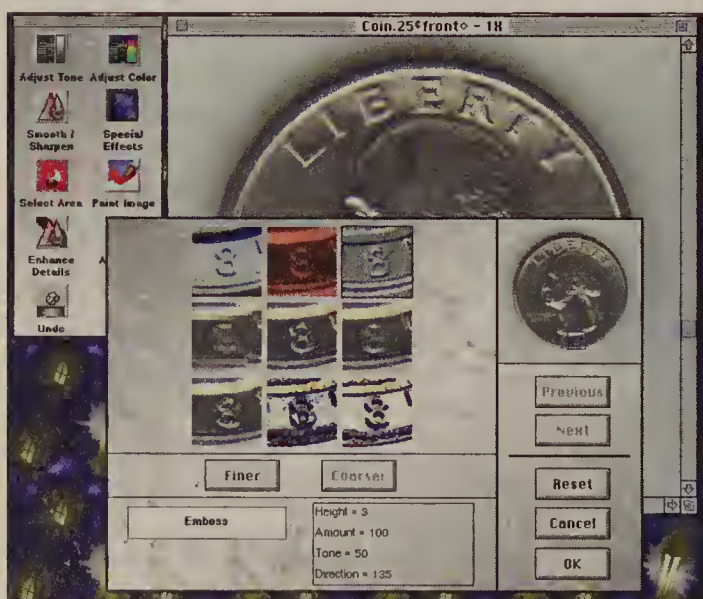
with associates who use DOS-based machines. The program also supports the major image file formats, including TIFF (with LZW compression), JPEG, and Scitex CT, as well as the DOS standards GIF, PCX, and BMP. What Image Assistant lacks is support for QuickTime compression and Photoshop’s native file format, as well as for Photoshop plug-in filters, preventing you from taking advantage of third-party filter collections, such as Aldus Gallery Effects and the recent Kai Power Tools from HSC Software.

Despite its significant shortcomings, Image Assistant offers two redeeming surprises: it scans images from magazine pages and other documents that contain both text and graphics, and it prints color separations. Image Assistant supports direct scanning from several devices, including the Apple One Scanner and the Hewlett-Packard ScanJet. During the scanning process, the program can distinguish graphics from text, straighten and automatically crop graphics, and filter out the moiré patterns that generally occur when scanning halftone artwork. When it comes time to output your image, you can convert the image to CMYK, adjust independent color channels, specify screen angles and halftone frequency, and print thumbnail samples of different output settings.

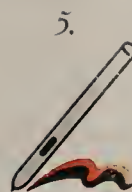
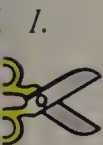
If only Image Assistant’s image-editing talents consistently measured up to its scanning and printing capabilities, it would be a strong program, easily capable of satisfying casual users and even attracting some Photoshop devotees. But the program provides few other notable features and is diminished by a clumsy interface. Image Assistant has to redraw the entire screen after most operations, so you spend much of your time waiting. Nor can you cancel lengthy operations such as opening and saving files.

The program is also plagued by more than its share of bugs and idiosyncrasies. The Cancel button inside the Paste Controls dialog box neglects to cancel feathering settings, the program beeps at you when you use System 7 keyboard equivalents in the Open and Save dialog boxes (such as ⌘-D to activate the Desktop button), and you can transfer only rectangular selections from Image Assistant to other applications via the Clipboard. Caere Corporation says it’s working to remedy these problems in an upcoming release (perhaps available by the time you read this). But until Caere overhauls the program’s image-editing capabilities and strengthens the interface, Image Assistant will remain at a disadvantage compared with programs costing half as much.

—DEKE McCLELLAND



Try before You Apply In Assist mode, Image Assistant lets you preview the results of several color-balance and special-effects options at a time.



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on your computer. Then (5) print it, and (4) scurry on down with both to your local Wacom dealer. Don't know where

one is? Just call 1-800-922-6613. When you get there, (5) trace the mouse on an

ArtZ. *Feels good*, doesn't it? Now (6) print it and (7) compare the two. OK? Now

(8) pull out your pocketbook. You've been doing *mickey mouse art* long enough.

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Mozart: The
"Dissonant" Quartet

PROS: Uncomplicated text; unusual essay on stringed instruments. **CONS:** Somewhat unchallenging commentary; lacks introductory essays for novices; few contrasting musical excerpts.

COMPANY: The Voyager Company (310/451-1383). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; CD ROM drive; speakers or headphones; System 6.0.5. **LIST PRICE:** \$59.95.

Schubert:
"The Trout" Quintet

PROS: Lively, uncomplicated text. **CONS:** Somewhat unchallenging commentary; lacks introductory essays for novices; minor volume-level problems. **COMPANY:** The Voyager Company (310/451-1383). **REQUIRES:** Mac

Plus; 2MB of RAM; hard drive; CD ROM drive; speakers or headphones; System 6.0.5. **LIST PRICE:** \$59.95.

Richard Strauss:
Three Tone Poems

PROS: Uncomplicated exposition; effective use of diverse musical excerpts; insightful commentary; includes annotated discography.

CONS: Lacks introductory essays for novices; minor volume-level problems. **COMPANY:** The Voyager Company (310/451-1383).

REQUIRES: Mac Plus; 2MB of RAM; hard drive; CD ROM drive; speakers or headphones; System 6.0.5. **LIST PRICE:** \$59.95.



THE VOYAGER COMPANY'S THREE recent additions to its CD Companion Series—Mozart: The "Dissonant" Quartet, Schubert: "The Trout" Quintet, and Richard Strauss: Three Tone Poems—suggest the direction in which single-composer music-appreciation software is headed.

Each consists of HyperCard stacks and a CD containing a recording of a single extended work (or in the case of the Strauss, three) and a collection of related excerpts. Buttons let you move to the program's main divisions and subsections, flip from card to card, jump to a recently viewed card, or find a specific card (by card number or content). Other buttons

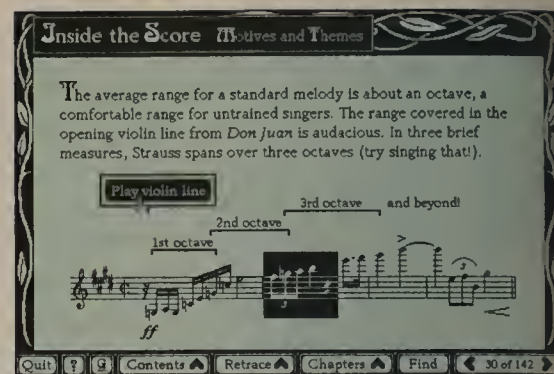
turn on and off balloon help and the gray underline that highlights terms explained in the glossary. Clicking on the underlined word switches you to the desired glossary card, and card-specific buttons open brief informational sidebars or play musical excerpts (in the Strauss and Schubert, the volume levels of the excerpts sometimes vary). The cards themselves generally contain artful combinations of ornamented borders, period illustrations, occasional animation, and text.

Unlike Warner New Media's music programs, which tend toward an intricate hypertext approach, Voyager titles are more linear and booklike. The texts of these three programs contain the same basic elements: a structural outline ("pocket guide") of the composition, a play-by-play commentary that accompanies the performance, historical background, a brief biography of the composer, essays on the music, a glossary, a bibliography, and finally, a quiz game. Strangely, the pocket guide is at the beginning of all three programs, followed in the Strauss and Schubert programs with the play-by-play commentary—before the sections on how to listen to (and what to hear in) the music.

Most Warner titles offer three or more real-time commentaries differing in depth and emphasis; Voyager's include only one, and sadly, in these three programs all are comparatively unexciting (the Strauss has the best). The lack of essays on basic musical concepts is disappointing (Warner does better here). Musical notation is almost entirely absent in the Schubert and Mozart discs; as a result, the programs virtually ignore musical themes and motives. And only the Mozart quiz/game truly tests your new musical knowledge; the games in the other two titles are pretty lame.

The text of Schubert: "The Trout" Quintet, is by Alan Rich, a critic, UCLA lecturer, radio commentator, and author of Voyager's So I've Heard series. Rich conveys his enthusiasm for this very appealing music, although he occasionally pours it on a little thick. Unlike that of the other two titles, nearly all discussion of the Schubert is confined to the real-time commentary, so it's not as probing as it could be; however, the supplementary essays draw on diverse musical excerpts from Bach to Mozart to Beethoven. The disc includes a complete recording of Schubert's original art song, "The Trout," the basis for the fourth movement of the quintet.

The text for Mozart: The "Dissonant" Quartet is by Robert Winter, a UCLA faculty member, radio commentator, and author of two previous Voy-



Push-Button Strauss Click on a button in the Motives and Themes section of Voyager's Richard Strauss disc and watch the bouncing highlight trace the progress of the playing musical excerpt.

ager programs. It has an unusual, and unusually detailed, essay on the anatomy of stringed instruments, brief discussions of general musical concepts, an analytical overview of the quartet, and a taped minilecture (and slide show) on Mozart's life and times. Sad to say, the musical excerpts in the essays, though well chosen, are limited almost entirely to the title piece; and Winter's 23-minute history lecture contains no music at all.

The works in Richard Strauss: Three Tone Poems are *Don Juan*, *Till Eulenspiegel*, and *Death and Transfiguration*, with commentary by Russell Steinberg, a composer, UCLA faculty member, and principal author of Warner New Media's The Orchestra. Steinberg's prose is not lively, but his overall approach is the most effective. Noteworthy are the excellent discussions of texture, color, and orchestration in the three works; the helpful analysis of the music, apart from the real-time commentary; the wide variety of musical examples (ranging from Berlioz and Wagner to the music from *Gone with the Wind*); and, for the first time on a music CD ROM, comparisons of different performances of the same piece. Also commendable is Steinberg's willingness to use musical notation (and a kind of quasi notation when space is limited) where it's useful.

Although I much enjoy the music, I'm disappointed with Voyager's Mozart and Schubert discs. They're certainly worth exploring, but if you can afford only one chamber-music disc, pick Warner's The String Quartet (based on Beethoven's String Quartet No. 14); it offers more help for beginners and a more thorough analysis of a chamber work. Voyager's Strauss disc does offer a satisfying musical analysis and lush orchestral music that is likely to appeal to beginners. For these reasons, and because it fills an important gap in the CD ROM music catalog, I recommend the Strauss disc to both novice and experienced listeners.

—ROBERT C. ECKHARDT

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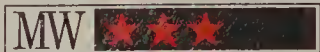
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Encyclopedias on CD ROM

Compton's Multimedia Encyclopedia 1.00M

PROS: Variety of multimedia features and options; includes complete dictionary; writing style appeals to young readers. **CONS:** Expensive; sluggish; hardware intensive; dated content. **COMPANY:** Compton's New Media (619/929-2626). **REQUIRES:** Mac LC; 4MB of RAM; CD ROM drive; color monitor; 40MB hard drive; System 6.0.7. **LIST PRICE:** \$795.



The New Grolier Multimedia Encyclopedia

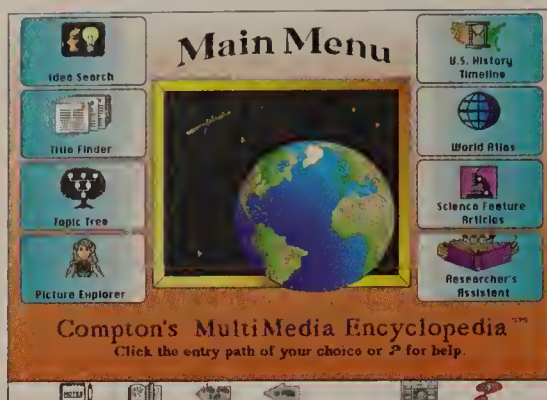
PROS: Easy to use; relatively fast; scholarly content; relatively inexpensive. **CONS:** Writing style may be too academic for young readers. **COMPANY:** Grolier Electronic Publishing (203/797-3530). **REQUIRES:** Mac Plus; CD ROM drive; hard drive; color monitor for QuickTime; System 6.0.5; QuickTime for access to film clips; . **LIST PRICE:** \$395.



ENCYCLOPEDIA RESEARCH OFTEN requires working your way through related articles, following a trail of "see also . . ." notations, and accumulating a stack of heavy volumes. But when stored on a compact disc, an encyclopedia can be a hypermedia document, enabling the reader to explore a topic by clicking a mouse instead of flipping pages. What's more, because it can integrate text, pictures, graphs, charts, sounds, animations, and film clips, the CD ROM medium can transform the venerable encyclopedia into something entirely new—an interactive multimedia learning center.

Macintosh users have two CD ROM encyclopedias to choose from: The New Grolier Multimedia Encyclopedia and Compton's Multimedia Encyclopedia. Compton's enables you to read about whales, look at photos of whales, listen to whale songs, and view an animated sequence showing whale movements through the ocean. Similarly, the Grolier Encyclopedia lets you read about birds, view full-color pictures of birds, and listen to recordings of their songs. Despite their similarities, these two encyclopedias are different enough to offer the consumer a choice.

Compton's Multimedia Encyclopedia COMPTON'S NEW MEDIA DESIGNED ITS product with younger audiences in mind

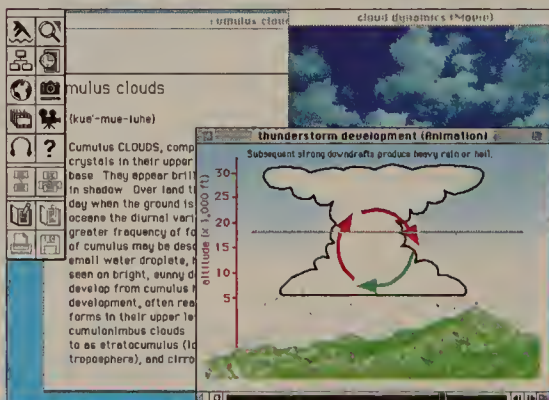


Many Paths to Knowledge Compton's opening picture menu offers a variety of ways to explore the facts on the disc.

(as young as age six, according to the company). Its readable style makes it a useful resource for the primary and middle school student, as well as for families. Beyond the encyclopedia, the Compton's CD ROM also includes a dictionary—the complete *Merriam-Webster's Intermediate Dictionary*; an atlas; 40 animated sequences; and 60 minutes of sound effects, music, and speech. An opening picture menu offers a variety of ways to explore the disc (see "Many Paths to Knowledge").

The dictionary is especially handy and beautifully integrated with the encyclopedia. You can summon the complete definition and phonetic spelling of any word in any article by double-clicking on the word. At first glance the atlas, accessible through the opening picture menu or through numerous map icons in encyclopedia articles, promises to be as handy as the dictionary. It allows you to view any spot on a globe marked with political boundaries. You can even zoom out or in by dragging a space-shuttle icon up or down.

Unfortunately, the globe images have little detail and are slow to redraw when you change your viewing position or altitude. Also, the globe is dated by the presence of the U.S.S.R. and other historical artifacts. Finally, it's not easy to backtrack from the globe to your original article. The atlas is a clever idea, but it has little



Both Sides Now With the New Grolier Multimedia Encyclopedia, you don't just read about clouds, you also view them in animations or fast-motion film clips.

potential for serious research. Fortunately, many encyclopedia articles include small maps with greater detail.

The Science Feature Articles section is the multimedia showpiece of the Compton's disc. Articles in this section are riddled with icons and other clickable spots for launching animated sequences, listening to sounds, or hearing the correct pronunciation of difficult words and phrases. Another section, the Researcher's Assistant, guides young students interested in developing their own research projects.

Compton's is loaded with features, but those features aren't without cost. The standard installation fills more than 4MB of hard drive space with encyclopedia-related files. If you can't spare that much space, you can choose the installer option to "conserve disk space." With this option the files consume only about 1MB of space, but the manual aptly warns that "performance may be sluggish." Believe it—even with the standard installation, performance is sluggish on an 8MB IICI. A third installation option offers "enhanced performance"—if you can spare 6MB to 8MB of hard drive space.

The New Grolier Multimedia Encyclopedia

COMPARED WITH COMPTON'S, THE Grolier Encyclopedia is lean and mean. It contains no atlas, no dictionary, no research guide for youngsters, and significantly fewer diagrams and pictures. But the encyclopedia text is remarkably current and scholarly, making it appropriate for an older, more sophisticated readership. Maps are detailed and easily accessible from the main text. Grolier's uses hypermedia expertly to make cross-referencing as easy as double-clicking. The Word Search feature is especially useful for locating every occurrence of a combination of words in the book. In seconds you can find every article that includes the words *computers* and *privacy*, or learn what major historical events happened on your birthday. For a CD ROM reference, searching, browsing, and opening articles are surprisingly fast—especially impressive considering that the application software takes less than 1MB of hard drive space.

The Grolier disc contains some nice features not found in traditional encyclopedias. Timeline, for example, provides a chronological list of events in human history from 40,000 B.C. to the present. Browsing through Timeline is fascinating, and if something piques your curiosity, it's easy to link directly to related articles.

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APPROVED

RECOMMEND

Recommend dual-tray option

COST
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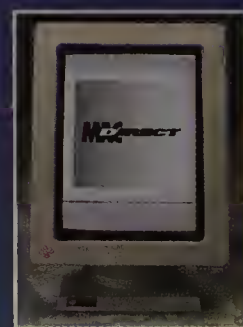
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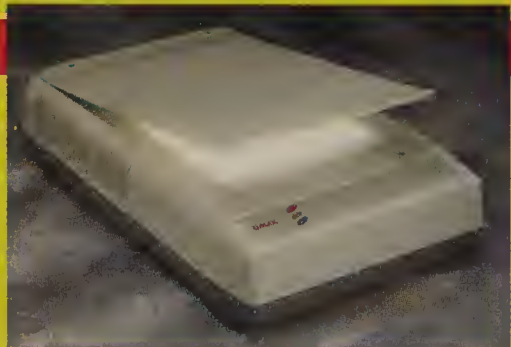
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- Includes cartridge

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120mb 3.5" LPS	\$358	\$438
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These drives combine a very fast and accurate mechanism from the leading manufacturer of DAT, with optional Retrospect 3.1 from Dantz Development. Just look at these specifications...

- 10.9mb per minute average backup speed- Means fast backup and restores, you won't wait for your data.
- Four-head Direct-Read-After-Write data verification- Assures your data will be there when you need it.
- Automatic built in head cleaner- Keeps your drive clean and error free.
- SCSI II compatible interface- Giving your drive compatibility with future Macs for years to come.
- 45 watt switching power supply & a metal cabinet - Assures strong power and protection.
- MTBF 50,000 hours- Means that your NuDesign drive will handle years of usage.

The NuDesign 2.1Gig and 5.0Gig DAT Drives



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MacWorld Editor's Choice

The Fujitsu 425 recently won the MacWorlds Editors choice award, this was for a combination of performance, quality and value. The Fujitsu 520 combines all of this plus the best dollar per megabyte available.

- 9 ms access times, 4400RPM Spindle Speeds and a 256k cache make these drives fast.
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C 85 MB	3.5" LPS, 2 yr warr, 150,000 MTBF	\$228	\$288
C 120 MB	3.5" LPS, 2 yr warr, 150,000 MTBF ..	\$288	\$348
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		Internal	External
C 212 MB	3.5" LPS, 2 yr warr, 150,000 MTBF (4500 RPM, Fastest 212 avail!) ...	\$438	\$498
C 540 MB	3.5", 3 yr warr, 8.5 ms, 4500 RPM, , (Our Fastest Drive Ever!) ...	\$988	\$1048

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NuDesign 5.0 Gig DAT	\$1398
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"Fast, inexpensive, good technical support, easy to use-this is a rare combination of qualities for a storage device."

MacWorld Editors in the November edition had great things to say about the NuDesign Optical, we think you will too. Give the drive a 30 day test and we're sure you'll be satisfied!

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The NuDesign 3.5" Optical Drive



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MacWorld 11/92



The NuDesign 2.1Gig and 5.0Gig DAT Drives



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NuDesign 5.0 Gig DAT

With SoftBackup**1398.00**

With Retrospect.....**1498.00**

This drive combines a very fast and accurate mechanism with optional Retrospect 3.1 from Dantz Development. Just look at these specifications...

- **10.9mb per minute average backup speed-**Get to your data fast!
- **Four-head Direct-Read-After-Write data verification-** Assuring your data will be there when you need it.
- **Automatic built in head cleaner-** Keeps your drive clean and error free.
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In addition to animated sequences illustrating scientific principles, the Grolier disc includes dozens of short QuickTime film clips, including the Hindenburg disaster, Gandhi emerging from a hunger strike, Nixon's resignation speech, and mold growing on bread (see "Both Sides Now").

Take Your Pick

MOVIES NOTWITHSTANDING, Compton's down-to-earth writing style and numerous bells and whistles make it appealing to young people. For adult researchers, Grolier's is easier and much faster to use, in terms of both finding what you need and getting to it, and though the dry, academic language might stop young students, it's not a stumbling block for adults.

Grolier's also lists for about half the price of Compton's—\$395 as opposed to \$795. However, since both discs come bundled for free with various CD ROM drives, for a few lucky buyers the price may be irrelevant. The bottom line is that both encyclopedias have a lot to offer to anyone with a CD ROM drive and a thirst for knowledge.—GEORGE BEEKMAN

3-D Effects Software

Adobe Dimensions

PROS: Illustrator-like interface; creates PostScript-based 3-D art that can be resized without distortion; artwork-mapping feature is ideal for creating package designs or adding perspective to Illustrator or FreeHand art. **CONS:** No text tool; no preview for PostScript on Clipboard; limited lighting and surface options. **COMPANY:** Adobe Systems (415/961-4400). **REQUIRES:** Mac II; 2MB of RAM; System 6.0.5. Recommended: 4MB of RAM; math coprocessor. **LIST PRICE:** \$199.



DOES THE MACINTOSH WORLD REALLY need another three-dimensional effects utility? We already have Pixar Typestry and Strata's StrataType 3d, both of which let you create photo-realistic 3-D text effects (see *Reviews, Macworld*, November 1992).

Capable as these programs are, their final results are bitmapped images, which you can't resize without introducing distortion. Bitmapped images are also tied to a specific number of dots per inch, so they can't take full advantage of high-resolution output devices such as imagesetters and film recorders.

Adobe Dimensions takes a different approach to 3-D: the vector, or object-

oriented, approach. The end result of a Dimensions session isn't a PICT or TIFF file, but an Illustrator or Aldus FreeHand file. You can open this file in a variety of draw programs and modify it—change its stroke and fill attributes, resize it, rotate it, disassemble it, and reshape it using the Bézier controls that are the foundation of PostScript-oriented draw programs. Dimensions bridges the gap between the third dimension and PostScript draw programs.

If you use Adobe Illustrator, you'll feel at home in Dimensions. Dimensions provides a floating tool palette and bottom-of-the-window information bar that work similarly to their Illustrator counterparts, as do Dimensions' tools for scaling and rotating.

Dimensions is designed to be used with Illustrator or FreeHand—it isn't very useful by itself. Dimensions doesn't have a Print command, and its tool palette lets you draw only three types of shapes: spheres, cones, and cubes. The program also lacks a tool for creating text. You must create text in Illustrator or FreeHand and then convert the text to outlines. I would like to have the option of creating text within Dimensions; Adobe says it's considering adding a text tool to a future version.

To create 3-D objects other than spheres, cones, and cubes, you must draw two-dimensional versions of them in an Illustrator or FreeHand file and then import the file into Dimensions and extrude the shapes or revolve them. Extrusion adds depth to an object's boundaries; revolving an object makes it spin around one axis, as though you're turning a block of wood on a lathe. You can rotate 3-D objects using Dimensions' trackball tool or by typing specific rotation values.

One of the most fun aspects of working with a conventional 3-D program is giving objects surface textures such as marble, stucco, or red brick. Dimensions doesn't support these kinds of textures—understandable, considering that textures are essentially bitmaps and Dimensions is an object-oriented program. Dimensions is limited to creating smooth surfaces with finishes ranging from matte to glossy. When you use Dimensions' rendering commands to generate the 3-D image, the program creates PostScript blends that simulate shading and depth.

For lighting your 3-D scene, Dimensions lets you create any number of light sources and specify their position and intensity. All lights produce white light. Adobe says supporting colored lights would be very complex in Dimensions' process-color, PostScript-oriented world.



The Adobe Dimension Dimensions' Artwork Mapping window (lower right) lets you apply an Illustrator or FreeHand file to a 3-D object. Here, a label created in Illustrator is applied to a bottle.

One of Dimensions' slickest features is its ability to map an Illustrator or FreeHand drawing onto a three-dimensional surface. If you're designing a package, you can create its label in Illustrator or FreeHand and then use Dimensions to electronically apply the label to a shape such as a bottle or box (see "The Adobe Dimension"). Dimensions accurately retains the characteristics of the art while also giving it the appropriate perspective. Besides being a boon to package designers, the artwork-mapping feature makes it easy to add accurate perspective to two-dimensional art.

The outcome of a Dimensions session is an Illustrator or FreeHand file, but you can also tell Dimensions to render an image and place it on the Clipboard for subsequent pasting into a publishing or word processing program. Unfortunately, Dimensions doesn't place a PICT version of the image on the Clipboard along with the PostScript version. As a result, you can't see the image once you paste it into another program; instead, you simply see the message "PostScript on Clipboard—no preview available."

Dimensions has a limited animation capability—specify the beginning and ending attributes for a shape, and Dimensions generates the in-between frames and saves each as an Illustrator file. Unlike Pixar's Typestry, Dimensions can't create QuickTime movies. You can, however, create a movie by importing the Illustrator frames into Adobe Premiere.

Adobe Dimensions is likely to be misunderstood. Anyone used to working with conventional 3-D programs may think Dimensions is very limited, what with its white-only light and lack of surface texturing. Only when you realize that Dimensions performs its 3-D illusions within the object-oriented, resolution-independent world of PostScript does it hit home that this is a ground-breaking program. Dimensions is an excellent 3-D tool for anyone who works extensively in Illustrator or FreeHand.—JIM HEID

PowerBook Utilities

Norton Essentials for PowerBook 1.0

PROS: Flexible power-saving features; excellent AppleTalk control. **CONS:** Doesn't monitor serial port for activity; some modules of little use. **COMPANY:** Symantec Corporation (310/453-4600). **REQUIRES:** PowerBook; System 7. **LIST PRICE:** \$129.



NORTON ESSENTIALS FOR POWER-Book (previously called GUM, or Guy's Utilities for Macintosh, and hereafter referred to as NEP) is an uneven collection of utilities. Some of NEP's modules are great, but some are mediocre.

First, the useful modules. Three battery-saving modules are quite good. Backlight Dimmer lets you specify an interval of time before the screen backlighting turns off, and it lets you choose whether keyboard or mouse movement, or both, reactivates the backlight. Battery Saver lets you control when the hard drive spins down, the PowerBook sleeps, and the microprocessor rests. You can have settings for different applications and switch to those settings when you launch an application. Unfortunately, Battery Saver doesn't monitor the serial ports; it only monitors the ADB port, so if you're uploading a file via modem, NEP can put the machine to sleep unexpectedly, thereby knocking you offline. You can set Battery Saver to wait for a long time to power down your telecommunications programs.

NEP's Instant Access module monitors the AppleTalk port, automatically turning AppleTalk on or off. Instant Access also remounts any server volumes at start-up and displays an icon in the NEP menu or the menu bar if AppleTalk is on or off.

Other useful modules are Caps Lock Control, which cures the caps lock key of its oversensitivity; Power Guard, which lets you password-protect your PowerBook; and the marginally useful Power Cursor, which replaces the system cursors with versions that are somewhat easier to see. Power Cursor also offers an animated rectangle that zooms to the current cursor location.

But some NEP modules are disappointing. Airport Shut Down is supposed to help when security wants to inspect your PowerBook. A customizable dialog box lets you shut down immediately. This module is unnecessary if you transport

your PowerBook in sleep mode, however. The Quick Notes module lets you jot down short notes (up to 64 characters), each one with an even shorter keyword (up to 32 characters). Quick Notes can be used for credit card numbers, but any notepad DA would offer more flexible note-taking. You can password-protect the notes, however. The Indicators module customizes the menu bar and NEP menu, and lets you display the time or date. The Power Keys module lets you set key combinations to control NEP's functions.

Battery Gauge has six charge indicators, including a time-remaining gauge and a simulated gas gauge. To check Battery Gauge's accuracy, I timed the actual battery life of two stock Apple batteries and an extended-life battery from Battery Technology. Unfortunately, Battery Gauge was inaccurate—it understated the battery life at the start and in the middle of the tests.

SyncIt compares two folders on different Macs and synchronizes them so that they contain the same files. SyncIt copies files in either direction and replaces older versions of files with newer ones. SyncIt works well, but only with one folder at a time.

Both NEP and Connectix's CPU are packages of PowerBook utilities. NEP's Instant Access is unique and useful, and the Battery Saver is more flexible than the CPU equivalent; but both NEP and CPU do poor jobs of estimating battery life. With at least three other PowerBook utility packages soon to be available, NEP will have to be revised soon to be an essential purchase for PowerBook owners.—TOM NEGRINO

Still-Video Camera/Video Digitizer

Canon ESP

PROS: Good image quality; easy to set up and use; innovative. **CONS:** Expensive. **COMPANY:** Canon USA (516/328-5970). **REQUIRES:** Mac II; 4MB of RAM; hard drive; System 6.0.7. **LIST PRICE:** \$4500 (includes one disk; ten-disk box \$100).



THE CANON ESP (FOR ELECTRONIC Still Presentation) system is a nonsense package that lets you shoot still-video pictures, digitize the video into a Mac for touch-up, and record the modified shots back to the camera for playback through any television set. Canon's system lets the desktop presenter take a Mac-produced video slide show on the road with

a minimum of equipment. All the presenter needs is the still-video camera (acting as a playback unit), an AC adapter, and a television monitor with a video input (Canon sells an optional RF adapter, in case you've got a really old TV).

The ESP system consists of three main parts. The core of the system is the RC-570 still-video camera, which records still-video snapshots on a 2-inch floppy disk. The next component is the SV-Mac NuBus video-digitizing board and its accompanying software. Rounding out the package is the SV Recording piggyback board.

Superficially, the RC-570 resembles Canon's consumer still-video camera, the RC250 (see *Reviews, Macworld*, June 1992). Unlike the RC250, however, the RC-570 was designed from the ground up to interface with a computer, and certain features make it a better imaging device. The RC-570's improved CCD (charge-coupled device) imaging chip creates higher-resolution pictures. Also, you can choose how pictures are stored on the floppy disk: as a video frame, which has higher resolution but takes up more disk space, or as a field, which has only half the resolution but requires half the disk space. One video floppy holds 25 frame shots, 50 field shots, or a combination of the two. The camera also comes with an integrated, motorized 3:1 zoom lens, with sharper optics than the earlier camera.

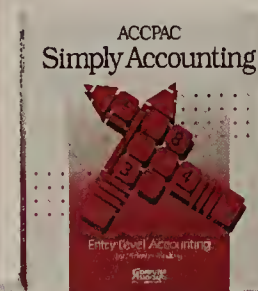
You can use the built-in flash; an extra option lets you attach a bracket for positioning an external flash. Removing the camera's battery allows you to slip in a cable that attaches to the AC adapter; the cable also has a built-in receiver for the camera's infrared remote control. The camera and its accessories fit neatly into a lockable hard-shell case the size of a small briefcase.

The SV-Mac NuBus board allows you to digitize video from the camera, bringing that video into the Mac. With the SV-Mac attached to the RC-570, you control the camera's playback and recording functions from the Macintosh, instead of directly from the camera. Attaching the SV Recording piggyback board to the SV-Mac NuBus board lets you record Mac images onto the video floppy disk inside the RC-570 camera. The SV-Mac hardware comes with software and a plug-in acquisition module for Adobe Photoshop. The SV-Mac software shows you thumbnails of all of the video shots on a video floppy; double-clicking on a thumbnail opens a window with the full-size image. You also get a surprisingly rich set of image-manipulation tools, enabling you to select, magnify, crop, resize, and flip

continues

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images; you can also change brightness and contrast, and apply special effects such as Posterize, Invert, Sharpen, and Trace Edges. You can erase images from the video floppy disk from within the software as well as directly from the camera. If you install the SV Recording piggyback board, the SV-Mac software also lets you record your choice of frame or field shots to the video floppy.

You can save the shots onto the Mac's hard drive in TIFF, PICT, and Photoshop formats. You can also save in an unusual format, Auto-JPEG, which is actually an application that uses the JPEG compression scheme; double-clicking on an Auto-JPEG file causes it to decompress into a TIFF file that most image-editing programs can open. You can even save a series of thumbnails as a QuickTime movie file; this feature enables you to create stop-motion animations.

The ESP system is easy to set up and use. After charging the camera's batteries, I just went out and shot a few floppies' worth of pictures, using both frame and field modes. I shot indoors and outdoors, in sunny and overcast weather, and I used the built-in flash. Then I viewed the images on my television. The image quality of shots made in well-lighted conditions was very good. Light from the built-in flash drops off rapidly, so you tend to get overlighted foregrounds and overly dark backgrounds. But if you take some care, you can get decent pictures with the flash.

I tried opening several Photoshop files in the SV-Mac software, then saving them to the video floppy. On the Mac screen the images showed some loss of detail, but on a television they looked great. This is a case where the lower resolution of a TV actually benefits the user.

The Canon ESP system works as promised, and it's a good solution for presenters who need to create video slide shows that incorporate photographs, not just text and graphics. The Canon system

has two big pluses: a high-quality still-video camera and the ability to play back on any television. But at a list price of \$4500, it is quite expensive. For that kind of money you can take one of the PowerBooks with video output, team it up with a computer monitor, and run your Aldus Persuasion presentations directly. If you mostly do standard Mac presentations, the ESP system probably isn't for you. But for professionals who need to do a lot of image capturing, such as real estate brokers who must show properties to potential buyers, I'd recommend the ESP system in a minute.—TOM NEGRINO

Address Book Program

Dynodex 3.0

PROS: New integrated word processor with mail merge; synchronizes files between desktop Mac and PowerBook; improved interface.

CONS: Manual is incomplete; synchronizing can be tricky. **COMPANY:** Portfolio Software (408/252-0420). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 6.0.4. **LIST PRICE:** \$89.95.



PORTFOLIO SOFTWARE'S UPDATE OF its flagship address manager adds welcome features and value while maintaining the program's strengths in speed and ease of use.

After installation, with Apple's Installer program, Dynodex opens to the familiar two windows. The right-hand one, Just Names, shows a scrollable list of all your contacts. Clicking on a name brings up that contact's record in the Entry Screen window on the left side of the screen. You can control most functions, such as adding and deleting records, using the icon palette in the Entry Screen or through menu choices and \mathbb{H} -key equivalents. In color, the Entry Screen sports a new, boxy 3-D look similar to many Microsoft Windows applications. While Dynodex's interface still conforms to the Mac interface guidelines, it's clear that Portfolio wants to make its Mac and Windows versions look as much alike as possible. Although I did not test this feature, Portfolio claims that Mac and Windows Dynodex files are completely compatible and can be opened on either platform.

Dynodex includes some new features as well as im-

provements to some old ones. You can now write a memo using the limited word processor. You can select fields from the address book to place into a memo, and when you print the memo, Dynodex automatically merges the fields into it. You control the font, size, and style of text, but that's about it. The memo writer isn't a great word processor, but for its intended use, it works fine. I found it useful for short letters that I wanted to send to several people.

Another new feature, file synchronization, is of special interest to PowerBook users. While there are dedicated synchronization programs on the market, such as Inline Design's Inline Sync and Leader Technologies' PowerMerge, those programs work on a whole-file basis; that is, they copy the newest version of a file to whatever machine contains the older version. Dynodex's synchronization works with both versions of an address file, adding and changing records from each file as necessary. This works well when you add or modify records in files on both machines. The problem comes when you delete records from one machine; the next time you synchronize, Dynodex thinks the deleted records are "missing" from the other machine and adds them back. A workaround is to first synchronize your files, then delete records on one Macintosh's Dynodex file, and finally manually replace the now-outdated file on the other Mac with the file from which you just deleted records.

Other changes are smaller but still welcome. Dynodex 3.0 finally adds automatic telephone-number formatting. The Date Stamp feature can be configured to place the date, the time, or both into any field; and you can record the duration of phone calls with the timer option. Although Dynodex has improved the options for dialing when you use a credit card, it still isn't quite right: the program now dials the credit card suffix on all long-distance calls. It would be more useful to have it include the suffix only when you hold down a key and click on the Dialing icon. And you can now copy and paste an entire record; it goes onto the Clipboard in tab-delimited format.

The program now stores up to eight different return addresses, which is good, but it doesn't let you name them, which is bad. Naming them would allow you to jump immediately to the return address you want, instead of looking through Return Address 1, Return Address 2, and so on.

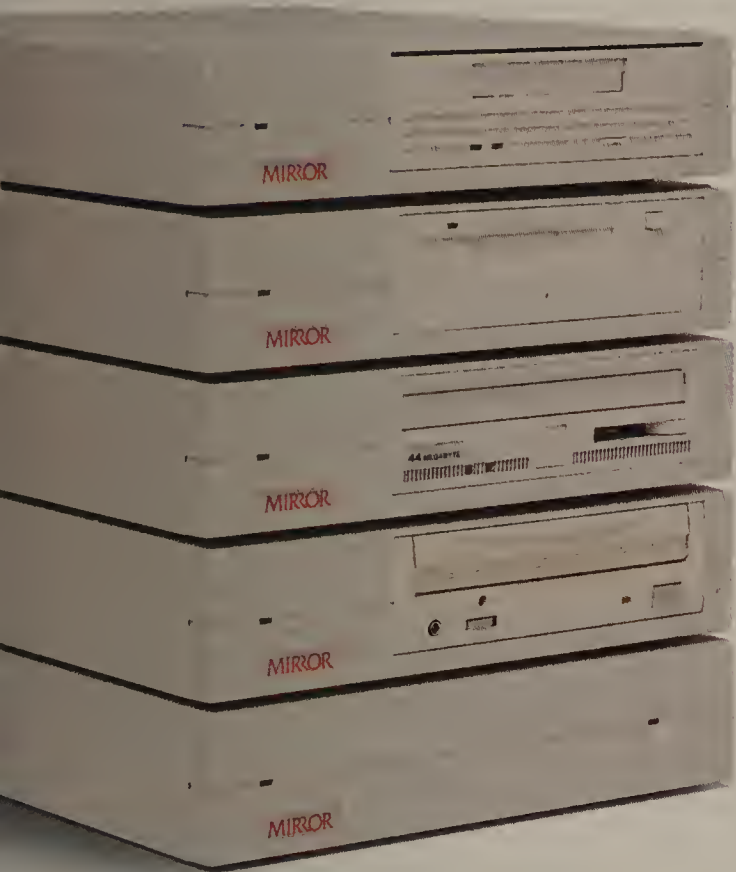
Printing, especially double-sided printing for address books, has always been Dynodex's strong suit, and this ver-



The Canon RC-570 and video floppy disk (shown here next to 35mm slides, for scale)

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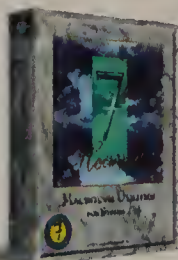
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sion doesn't disappoint. When you print, you can now choose to print one record, all records, or just selected records, and you can change layouts and sort the database. Options for double-sided printing and page order have been moved to the Page Setup dialog box, where they belong. Portfolio has added new layouts for the Apple StyleWriter and the Hewlett-Packard DeskWriter. There are also improved printing instructions in the manual and on screen. Unfortunately, the manual needs some work in other areas: the index is incomplete and the manual and Read Me files leave out a few features altogether.

Portfolio has certainly kept up with the other address book programs on the market: Dynodex 3.0 inches ahead of competitors like After Hours Software's TouchBase 2.0, but Dynodex doesn't have a connection to a scheduling program, whereas TouchBase integrates with After Hours' DateBook. Users who are looking for an all-in-one solution for address management and scheduling may wish to look elsewhere, but as an address book manager and printing program, Dynodex does an excellent job.

—TOM NEGRINO

Music-Education CD ROM

The Orchestra: The Instruments Revealed

PROS: Great musical selections; excellent commentary on theme and variation. **CONS:** Unfocused structure; lacks adequate background for classical music novices; lackluster and jargon text; expensive. **COMPANY:** Warner New Media (818/955-9999). **REQUIRES:** Mac Plus; 1MB of RAM (2MB for color); hard drive; CD ROM drive; speakers or headphones; System 6.0.5. **LIST PRICE:** \$79.98.



IT DATES ME TO ADMIT IT, BUT I remember watching Leonard Bernstein's Young People's Concerts on television—in glorious black-and-white with decidedly low-fidelity sound. Perhaps most memorable was Bernstein's introduction to the instruments of the orchestra, using a piece designed for just this purpose, Benjamin Britten's *The Young Person's Guide to the Orchestra* (also known as *Variations and Fugue on a Theme by Purcell*). Lacking a similar spokesperson for serious music, this generation of young people must rely on music-education CD ROMs. Warner New Media's *The Orchestra*, featuring the Britten work, is

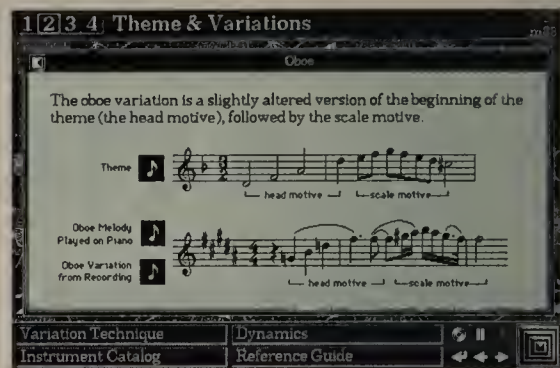
the modern counterpart to the classic Bernstein concert.

Like all of the current crop of music CD ROMs, *The Orchestra* combines HyperCard stacks and a CD ROM of recorded music. The main screen contains buttons that lead to the program's various parts, and a sliding pointer that enables you to start *The Young Person's Guide* at any point in the performance. Most cards also provide a button that gives you access to CD player-like controls, and other buttons that let you navigate from card to card, jump to related topics, or return to the main screen. On certain cards, buttons play musical examples, pronounce musical terms, and open sidebars containing additional information. Clicking on boldface words jumps you directly to their corresponding glossary entries.

Like Warner New Media's past efforts, *The Orchestra* adopts a many-branched, interwoven hypertext style, compared with The Voyager Company's more linear approach. This adds a certain richness and an element of the unknown, but I find the program harder to navigate and digest. Worse, it doesn't provide the newcomer to classical music a clear idea of where to start. Add to this the fact that much of the program assumes an unrealistically high level of motivation and understanding, and you've got big trouble for anyone new to classical music. The absence of a good introductory essay to orient the listener is a significant flaw.

The Orchestra's sections include three play-by-play commentaries on the performance (plus a notebook for entering your own comments); essays on orchestra history and sound, conducting theory and practice, variation-and-fugue technique, Benjamin Britten, Henry Purcell, and so on; a catalog of the instruments; a glossary and several indexes; and a quiz in the form of a game. Unlike other titles from both Warner and Voyager, *The Orchestra* seems tuned to the television generation: most sections are distressingly skimpy. Tempo and dynamics, for example, are described on just a card or two. And though topics such as musical notation, harmony, scales, and meter are covered well on other Warner titles, they're not adequately explained anywhere in *The Orchestra*. On the other hand, one of the highlights of the program is the catalog of instruments, an entertaining, enlightening, and thorough introduction to the various instruments—how they work, what they look like, and how they sound.

Apparently to revive listeners with flagging attentions, *The Orchestra* includes some puzzlingly irrelevant essays,



The Best of Britten One play-by-play commentary in *The Orchestra* analyzes the structure of Britten's *Young Person's Guide* and explains how each part was derived from the original Purcell theme.

such as *Weird Sounds* from the *Orchestra*, and *Europe before the Walkman*, which haphazardly intermixes music-history trivia with milestones in music recording. Surprisingly, Warner does not match these efforts to jazz up the format with an equal effort to spice up the text itself. On the contrary, the writing is often unenthusiastic, lapsing all too often into sleep-inducing musical jargon ("Dotted rhythms soften into a rubato melody. The rubato passage then varies the rise and fall of the scale motive . . ."). Of the three play-by-play commentaries that accompany the music, one is simply a dull enumeration of the composition's parts, and one is a decent but lackluster attempt to highlight the instruments and instrumentation in the work. Fortunately, the third commentary is a near-perfect example of what a program like this can do. With a simple text, effective use of informative sidebars, and abundant musical excerpts, it thoroughly explores and explains the structure of the piece.

The London Symphony Orchestra performance of *The Young Person's Guide* used here (conducted by Britten himself) is top-notch, even though the recording occasionally shows its age (especially when you want to pick out a single instrument in a dense orchestration). While the music is exhilarating and easily merits repeated listenings long after you've outgrown the guide aspect, sadly the same cannot be said for *The Orchestra*. Though the program is primarily for beginners, new listeners will find many parts of it difficult to comprehend, with precious little online help. And though experienced listeners will undoubtedly enjoy the theme-and-variation commentary, they'll find little else that's worthwhile. Almost any music-education CD ROM from Warner or Voyager is better designed and, compared with *The Orchestra's* high price of \$79.98, a better value. Unless Britten's work is of overriding interest, I recommend you steer clear of this one.—ROBERT C. ECKHARDT

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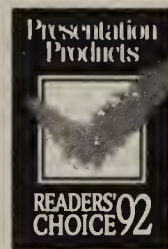
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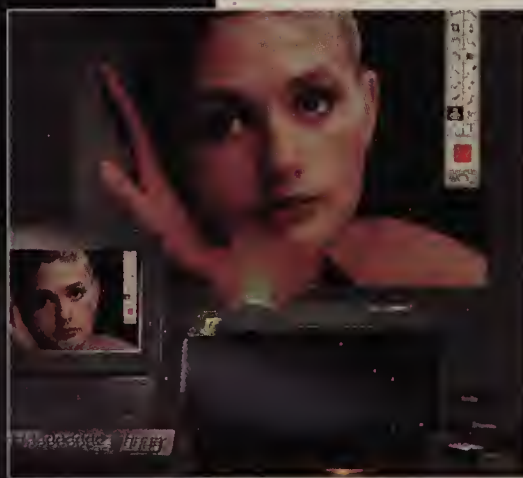


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Media-Integration Program

Passport Producer 1.0

PROS: Straightforward interface; frame-accurate time controls; surprisingly extensive MIDI editor. **CONS:** No leading control; can't edit multiple slides at a time; no support for TIFF or EPS. **COMPANY:** Passport Designs (415/726-0280). **REQUIRES:** Mac II; 5MB of RAM; SuperDrive; hard drive; System 7. Recommended: 68030 processor; 8MB of RAM. **LIST PRICE:** \$495.



IN MANY WAYS, YOUR MAC IS ALREADY a multimedia machine. Maybe you don't have a scanner, a QuickTime input board, a sound recorder, a MIDI sequencer, and a CD ROM player, but you can still assemble screen presentations that move and make noise by assembling images, animation, and sound clips you've created using other programs or acquired from online services. Passport Producer is one of the new breed of entry-level multimedia programs that enable you not only to control a variety of devices from a single application, but also to make the most of the resources you already have.

Producer permits you to integrate the five basic kinds of media—text, still images, animation, movies, and sound—to create presentations that you can either play on screen or output to video. To assemble your presentation, you position media elements on a time line, called a *cue sheet* (see “Working on the Time Line”). Each element, or *cue*, plays according to its position in the cue sheet. In theory, you can play up to eight cues simultaneously; in practice, however, playing more than three or four at a time usually impedes performance. For example, having assigned Producer 12MB of RAM on a IIci with a 40MHz cache card, I encountered glitches when I tried to run a slide with a transition effect at the same time that I played an animation sequence and a QuickTime movie. Producer skipped frames and played cues significantly later than it was supposed to. In the worst cases, very short cues failed to appear at all. Very likely, at the outset you'll spend a lot of time trying to balance the program's capabilities against your system's limitations.

Producer's timing controls are its greatest strength.

The program measures time according to the SMPTE (Society of Motion Picture and Television Engineers) time code, enabling you to specify the exact video frames at which a cue begins and ends. To precisely synchronize images and sound, you can record time markers during playback—simply watch the movie and press the tab key whenever an event that you want to mark occurs. You can then align the beginning or end of a cue to the marker or leave the marker in place for later reference. You can also crop a cue to a desired length or stretch a cue so that it repeats over and over for a specified amount of time.

Sound is Producer's other strength—not surprising, considering Passport Designs' track record as a supplier of sequencing, recording, and composing programs. You can add digitized sounds from disk, play songs directly from audio CDs, and even throw in a few MIDI files for controlling synthesizers and sound modules. Producer includes a comprehensive MIDI editor that lets you select instruments, mix them by adjusting instrument volumes, transpose tunes, and even adjust stereo balance.

Unfortunately, Passport Producer doesn't treat all media equally. Its slide editor—used to create headlines and bulleted text—offers no control over leading or paragraph spacing, so that lines of type invariably appear packed together. You can't format multiple slides at once; and there's no provision for automated builds, in which each bulleted item is added sequentially to the list of previous items, as in traditional presentation programs such as Aldus Persuasion and Microsoft PowerPoint. Producer imports still images saved in the PICT format, including those compressed using QuickTime's JPEG, but it lacks support for other graphic formats such as TIFF and

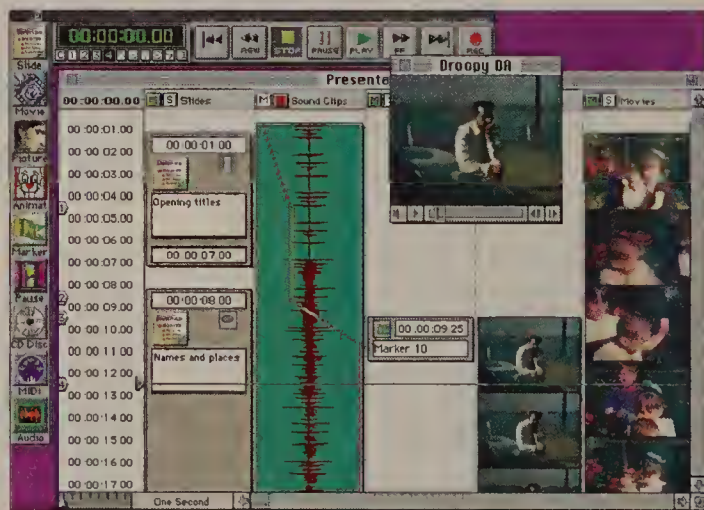
EPS. In terms of image handling, only Producer's QuickTime movie support measures up to what I expected. You can copy and paste frames between movies and even adjust sound levels throughout the duration of a movie.

While straightforward in design, the cue sheet suffers its share of problems as well. You can select multiple cues, but you can't move more than one at a time, which complicates the editing process unnecessarily. If you crop a cue down to just a few frames (as when playing a single word from a sound file), you can't recover the cropped media in the cue sheet—say, to stretch it to two words—because the cue is too small to manipulate. The remedy I eventually stumbled on—no thanks to the manual—involved several steps and wasn't much easier than reimporting the element from scratch. Also, many of Producer's menu commands remain available even when they produce no effect. For example, you can choose Edit Cue when a CD icon is selected, but Producer ignores you. This can be a bewildering experience for first-time users.

While the cue sheet has its limits, the program offers some other welcome features. Producer's time controls let you insert pauses to delay the action for a specified amount of time or until the viewer presses the mouse button. Producer even introduces a smidgen of interactivity by allowing you to store up to ten locations on the time line. You can then return to one of these locations during playback by pressing the corresponding number on the keyboard. For example, the viewer could select a QuickTime clip from a numbered list, or a presenter could select an illustrative slide in response to a question from the audience. There is a bug in this, however. To change a stored location, you must first clear it and then reassign it. Supposedly, you can clear each one independently, but if you clear the first stored location, you clear all the others as well; clearing any of the others independently works fine.

If you're a MIDI composer or some other variety of sound enthusiast itching to try your hand at assembling a multimedia presentation, you'll find Passport Producer both logical and capable. But if you're used to traditional presentation or animation software, you're more likely to be put off by Passport Producer's middling text- and image-handling capabilities, its inability to create gradient backgrounds, and its lack of even the most basic animation options. As it stands, Passport Designs needs to devote more effort to the visual half of multimedia.

—DEKE McCLELLAND



Working on the Time Line The cue sheet serves as a time line for positioning individual media elements, called *cues*. You can set a cue to display the times at which it begins and ends, like the slide cues in the left column, or view the contents of the cue, like the QuickTime movies in the two right-hand columns.

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*Electronic Handbooks require Mathcad 3.1.

Scriptwriting Software

Final Draft 2.0

PROS: Well-conceived; easily customized; many automated features; 30-day money-back guarantee. **CONS:** Copy protected; must hide ScriptNote markers to get exact page count; manual not indexed. **COMPANY:** MacToolkit (310/395-4242). **REQUIRES:** Mac Plus; hard drive; System 6.0.2. Recommended: 2MB of RAM. **LIST PRICE:** \$349.



ShowScape 4.1

PROS: Good format for storyboarding a video production; ability to create and print separate Linkfiles. **CONS:** Copy protected; requires WordPerfect; does not run under Multi-Finder; dual-application modes awkward. **COMPANY:** Lake Compuframes (914/941-1998). **REQUIRES:** Mac Plus; hard drive; System 6.0.3. **LIST PRICE:** \$429; with WordPerfect 2.0 \$679.



A SNAPPY STORY LINE ISN'T ENOUGH to get your script read. Busy agents, producers, and studio readers expect manuscripts to conform to film and video industry standards.

Traditionally authors have pounded on trusty manual typewriters, laboriously adjusting the margins for the various script elements, but many a recent scenario has been composed on a computer using a word processor's style sheets to shape the content. Now, formatting a script is easier than ever before. Here are two products specifically designed to ease the woes of the professional scriptwriter.

Final Draft

START TYPING IN A FINAL DRAFT WINDOW and the letters are all capitalized, the proper format for a slug line (scene heading). To format the next script element, a bit of action (scene direction), for instance, hold down the ⌘ key, and a bar appears at the top of the window listing available formatting elements—Slug Line, Action, Character, Parentheses, Dialogue, Transition, and General—each preceded by a number. Type 2, and your new paragraph is formatted for Action.

If you choose Character format with the character-matching feature turned on, you need type only enough letters to distinguish a character in your predefined Character List, and the full name appears, centered and capitalized. Now hit the return key, and you are in Dialogue for-

mat, the most likely subsequent format, and so on through the elements. You can override Final Draft's default hierarchy whenever you want, or customize the defaults to your liking.

Final Draft macros provide another timesaving shortcut. Some 18 terms commonly used in scripts—*fade to black* and *dissolve*, for instance—can be entered by key command. As with the format command, the available terms appear in the top bar with their corresponding numbers, when you press the option key.

To annotate the script, place the cursor in the desired position and choose ScriptNotes from the Document menu; a small resizable window pops up, ready for text. Closing the window leaves a tiny box in the text as a marker; click on the box, and the note reappears.

Besides importing scripts based on Microsoft Word style sheets and Cine-Write format, Final Draft's File Converter utility can employ a set of rules that enable it to automatically format scripts you've imported in text-only format. You can prepare special export files for Mac-Toolkit's Production Scheduling program that include scene-by-scene production information.

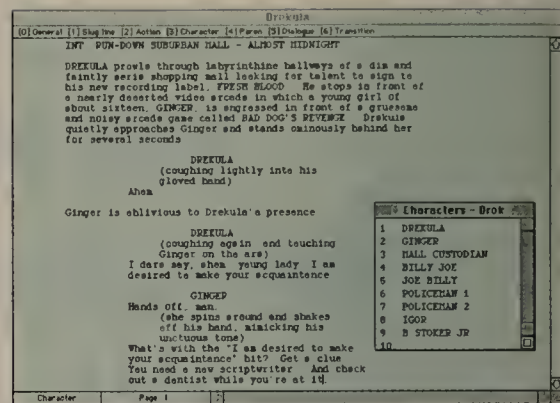
Final Draft includes smart page-breaks that keep longer passages together, but if it is necessary to split a passage across two or more pages, "More" and "Continued" appear at the respective bottoms and tops of the pages. To facilitate inserting changes into already distributed scripts, you can just print revised pages (revisions are clearly marked), and these pages retain the original page breaks.

ShowScape

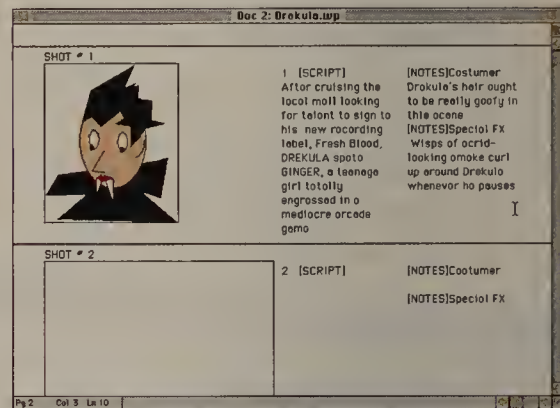
IF YOU ARE PREPARING A SCRIPT FOR video preproduction purposes, you might prefer ShowScape—if, that is, you want to work in WordPerfect. ShowScape imposes the format, but you actually write and edit the script in WordPerfect. For those unfamiliar with WordPerfect's idiosyncrasies, ShowScape's tutorial isn't very helpful; fortunately, ShowScape has a number of key commands that facilitate moving the cursor from shot to shot, and for tasks such as delete, cut-and-paste, and insert, which you use instead of WordPerfect's standard commands. If you use WordPerfect regularly you need to make sure that ShowScape's key sequences don't conflict with your own macro commands.

Whereas most word processors think in terms of paragraphs, ShowScape uses the shot as its basic editing unit.

In ShowScape you begin by defining whether you want to format your script in screenplay format (with dialog and



Automating the Script Using Final Draft, hitting the return key takes you to the next most likely format—from Character to Dialogue, for instance.



Hot Links ShowScape lets you create Linkfiles that contain specific information for specific tasks and individuals, in this case, notes for the costumer and special-effects team.

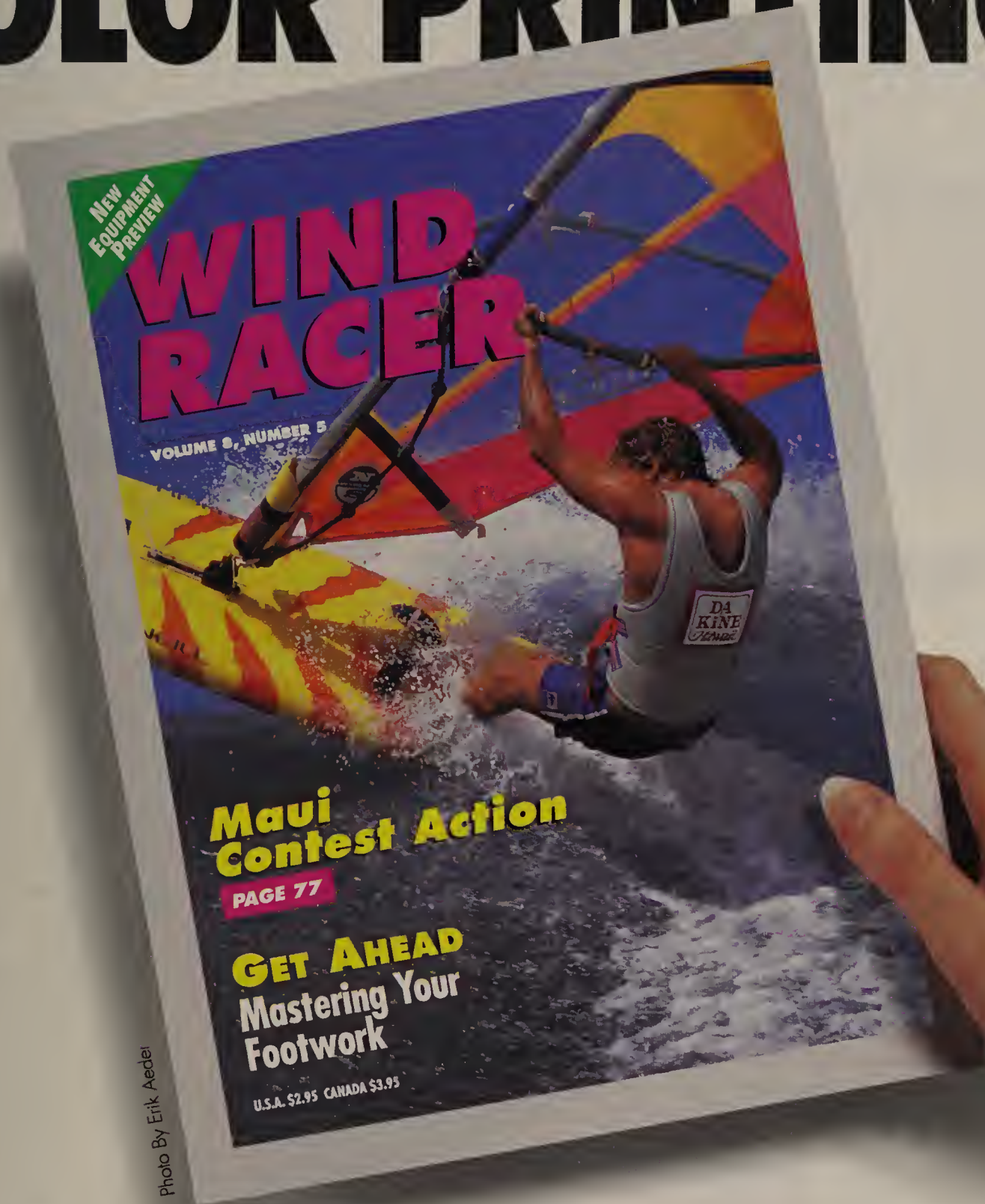
description sections) or in dual-column format (for audio and video), with or without storyboard graphics. You also choose the number of shots displayed per page—6 single shots, 3 single shots, 3 four-way split shots, or a 16-shot video-wall format.

ShowScape's proprietary Linkfiles allow you to create multiple video columns (in dual-column format) or action segments (in screenplay format) with individualized instructions or notes for the director, audio engineer, camera operator, and client, for instance (see "Hot Links"). Although you can customize the script format, placing graphics and typing text into any given format means working within fairly rigid constraints.

When printing the script, you can choose the whole script or specify shots by number, with or without graphics or Linkfiles. Printing on the Compuframe preprinted storyboards that correspond to your chosen format gives the final output a polished look.

Alas, Hollywood's penchant for dirty deals and stolen ideas impacts computer-aided screenwriters—both programs are copy protected. You can install either on your hard drive using included installation utilities, but don't abuse or misplace those master disks. You might want to reformat or upgrade your storage device someday.—SUZANNE STEFANAC

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Color Paint Programs

Color It 2.0.1

PROS: Versatile selection and retouching tools; 15 levels of undo; hefty supply of filters; toolbox improved over version 1.0.

CONS: Bewildering naming conventions; overpriced. **COMPANY:** Timeworks (708/559-1300). **REQUIRES:** Mac II; 2MB of RAM; hard drive; System 6.0.5; 32-bit QuickDraw. Recommended: Color monitor. **LIST PRICE:** \$299.95.



Paint It 1.0

PROS: Impressive selection and painting tools; straightforward interface; inexpensive.

CONS: Lacks image-editing features.

COMPANY: Timeworks (708/559-1300).

REQUIRES: Mac II; 2MB of RAM; hard drive; System 6.0.5; 32-bit QuickDraw. Recommended: Color monitor. **LIST PRICE:** \$59.95.



NOWADAYS, COLOR PAINT PROGRAMS are about as scarce as rabbits. Some software vendors (including Electronic Arts and Deneba) even sell more than one paint program. MicroFrontier, designer of Expert Color Paint and Color It, recently added a third program, Paint It, to its line. Color It and Paint It are both distributed by Timeworks.

Color It is the top of the MicroFrontier/Timeworks product line, and it's equipped with a full range of painting and image-retouching capabilities. Among the program's high points are 15 levels of undo; extensive control over antialiasing and feathering; versatile selection tools, including a magic wand that outperforms its equivalent in Adobe Photoshop; an 8-bit masking layer; and direct support for any scanner that offers a driver for either Adobe Photoshop or Aldus Digital Darkroom. And unlike most of the paint programs available in its price range, Color It allows you to selectively revert portions of an image to their last saved appearance or to their appearance prior to the last operation.

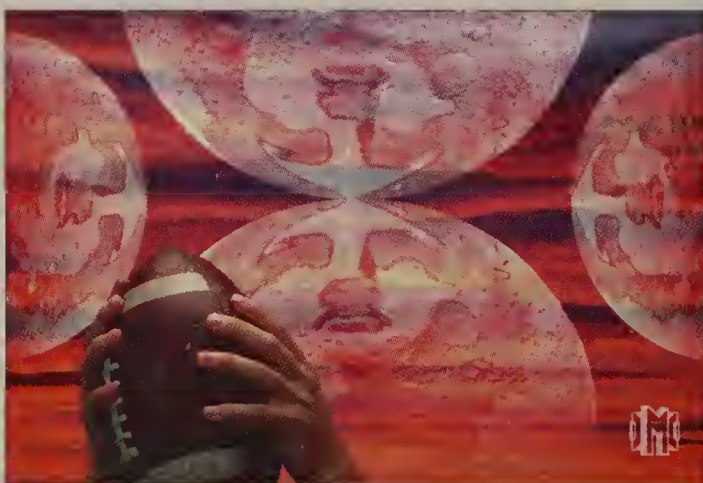
With version 2.0.1, Color It's toolbox is improved—it's much less confusing than before. The program also adds a generous supply of fil-

ters and a few color-correction options. You can colorize gray-scale images and homogenize blotchy scans. You can also apply special dithering routines when painting and when printing to QuickDraw output devices. Still, while generally more straightforward than before, Color It's filtering and dithering capabilities defy immediate understanding. Command names like Stochastic Light, Convolution, and Jarvis/Judice/Ninke make it easy to forget you're creating artwork and not performing an arcane surgical procedure. One minute, Color It is an entry-level paint program; the next, you need an advanced degree in color theory to get in the door.

Registered users of Color It 1.0 can upgrade for \$49.95. But if you plan to purchase version 2.0.1 outright, the retail price—more than twice that of its predecessor—might make you reconsider. Let's face it, at a little over \$100, the old Color It was a useful, if not altogether ideal, tool for casual users and novices. At \$300, the new Color It places itself in the same price camp as Fractal Design Painter, one of the finest graphics tools for the Macintosh, and one that easily outpaces Color It in the image-creation department.

That's why MicroFrontier/Timeworks' second paint program, Paint It, is particularly refreshing. Though Paint It lacks Color It's image-editing features—masking, feathering, multiple undos, dithering, and filters are all missing—it includes the same cast of versatile selection and painting tools that distinguish Color It from other low-end paint programs. Furthermore, it's incredibly straightforward and easy to use. And at only \$60, it's priced to sell. If only Color It were so simple and so reasonably priced, Timeworks would have the low-end bitmap graphics market all to itself.

—DEKE MCCLELLAND



Liberty Bowl I used Color It's paste controls to colorize the moon with a gradient and superimpose the face of the Statue of Liberty. I then overlaid the hands and football and used the program's selective undo capability to restore portions of the background and smooth the edges around the image.

Multitimbral MIDI Synthesizer

Yamaha TG100

PROS: Built-in MIDI interface; compact; adheres to General MIDI standard. **CONS:** Hard-to-use manual and controls; no serial cable provided. **COMPANY:** Yamaha Corporation of America (714/522-9011). **REQUIRES:** Mac Plus; music sequencer or MIDI-compatible software; amplifier or headphones; serial cable. **LIST PRICE:** \$449.



MIDI TECHNOLOGY (MUSICAL INSTRUMENT Digital Interface) lets the Mac actually play a synthesizer; not just both hands of the piano part, but every part in the orchestra simultaneously. MIDI files, which can be played by music sequencer programs and some multimedia authoring software, are ideal for multimedia presenters; unfortunately, every synthesizer's musical-instrument sounds (its patches) are arranged in a different order. A piece composed for flute and guitar on your synthesizer may play back with accordion and LunarBellz on somebody else's.

Recently, synthesizer makers have agreed to start arranging the patches of their instruments in a specified order (known as the General MIDI Spec): patch 1 is to be a piano, patch 7 a harpsichord, and so on. When every MIDI instrument is a General MIDI instrument, a song you orchestrate on one synthesizer will sound exactly the same when played on another synthesizer.

One of the first General MIDI synthesizers is Yamaha's TG100. It not only helps solve the orchestra-of-Babel problem but also takes a secondary revolutionary step: it includes a built-in MIDI interface (a \$50 to \$300 box that connects the Mac to the synthesizer). You save money, a couple of dangling MIDI cables, and another part to forget. On the other hand, incredibly, Yamaha doesn't include the cable that runs from the TG100 to the Mac. You still have to buy this serial cable, which may even be harder to find than a MIDI interface. (There are MIDI jacks on the back if you already own an interface.)

The TG100 is a slim black unit, smaller than a cigar box—a pleasant plus for traveling presenters. This synthesizer, like others of its type, doesn't have a piano keyboard. It's assumed that presenters will be most interested in playing back prerecorded MIDI songs, and are therefore happy to forfeit actual piano

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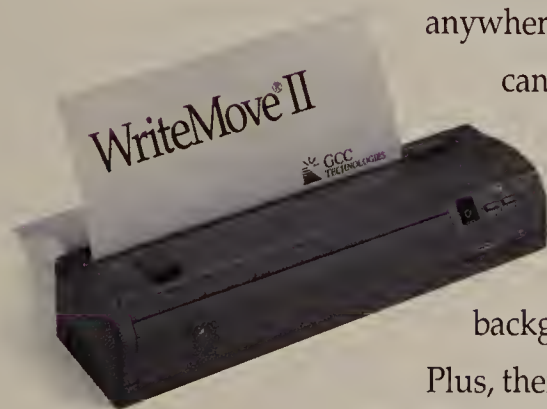
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keys in exchange for the lower cost, size, and weight of a simple tone generator. (There are three sources for ready-to-run MIDI files: online services like America Online, "clip music" disks such as those sold by Passport and Opcode, and local MIDI-equipped musicians.) As an unusual bonus, the TG100 has an Audio In miniplug jack, so you can plug in a traditional microphone (the microphone that comes with the Macintosh doesn't work here) and use the TG100 as a mini-PA system.

Sonically speaking, the TG100 won't convince you that you're hearing a live orchestra. The TG100's 192 sounds are as realistic as those on the popular Roland MT-32 or Sound Canvas—about what you'd expect on a low-cost MIDI instrument. (If you're interested, I recorded some musical snippets with my MacRecorder to give you an idea of the TG100's realism. I posted them on America Online in the Macworld forum so you can download them and play them through your Mac speaker.) You can edit these sounds, but your changes disappear when you turn off the instrument. The TG100 can play 16 independent lines of music simultaneously, each with a different sound, and can strike up to 28 notes at once. And there's a cherry on top: built-in reverb effects, for giving your music a little professional spin.

Unfortunately, the Yamaha TG100's design won't help beginners much. The non-backlit, one-line LCD readout displays only cryptic abbreviations (like "G 9G 6 ElPiano2"). And selecting sounds is unnecessarily difficult, as a result of the cost-saving six-button front-panel scheme. The manual, while at least acknowledging the existence of a computer called Macintosh, still makes the typical brusque synth-manual assumption that you already know what MIDI is and how to use it. If you are in doubt about MIDI, be sure you call up Yamaha and get your free copy of "Multimedia Applications for the TG100," an extremely clear booklet for the MIDI beginner.

Still, in its quiet way, the TG100 solves two of the major obstacles to mass popularity of MIDI: it eliminates one required component (the MIDI interface) and joins a handful of other new synthesizers that adhere to the life-simplifying General MIDI standard. The recording industry will be forgiven if it sniffs at the TG100's lack of instrumental realism; but for multimedia presenters, home music-software buffs, and anyone else with access to ready-to-play MIDI files, the TG100 is certainly among the cleverest and most compact music machines available.—DAVID POGUE

Document Management

VersionMaster 1.5

PROS: Includes file compression; automatically saves revisions; archives can be shared by network users. **CONS:** Not foolproof; no provision for removing older archived files; no utility for recovering files from corrupted archives.

COMPANY: AStar Technologies (508/486-8532). **REQUIRES:** Mac Plus; hard drive; System 6.0.4. Recommended: 2MB of RAM. **LIST PRICE:** \$199.95; five-user pack \$799.95; ten-user pack \$1199.95.



MACINTOSH USERS HAVE LONG needed a utility for archiving versions of a file and tracking the changes within those archives. VersionMaster is a step in the right direction, but only if you use it carefully, especially when you are sharing files within a workgroup.

VersionMaster helps you archive altered documents by maintaining a database of those documents. After you create the first version of a document, you create an accompanying VersionMaster project (you are the administrator or owner of the project) and then check your document into the VersionMaster database. (A VersionMaster database can contain more than one project.) Subsequent users of that document must then check the file out of the database, either to modify the document or to view it (there's a button for each option).

VersionMaster allows you to designate a particular folder on your hard drive as the recipient for any files that you check out of the project. When you're working in a networked environment and sharing project files with other users, be sure to use this option. If you don't, you'll end up writing over other checked-out files on the file server.

Each time you change a document and check the changed document back into the database, VersionMaster assigns the document a new version number and adds the document to the previous versions in the database. You can also enter comments about the changes into the database. As long as a VersionMaster user has checked out a particular version of an archived document for changes, no one else can check out the same version. However, if a version is checked out for viewing only, VersionMaster does allow another user to check out the same version for modification.

To simplify access to a project, VersionMaster adds a Checkout button to the usual Open dialog box found in any appli-

cation. You can also check out a document via the VersionMaster desk accessory. While working in a file, you can make changes and use the Save command in your application. But to check that file back into VersionMaster, you must use the VersionMaster DA.

VersionMaster works with any file server. However, since VersionMaster tracks projects by storing project information in the user's System Folder, the project's administrator must perform some additional steps. Once the administrator has created a VersionMaster project that will be used over a network, each user must add that project to his or her project file, using the Project Admin application.

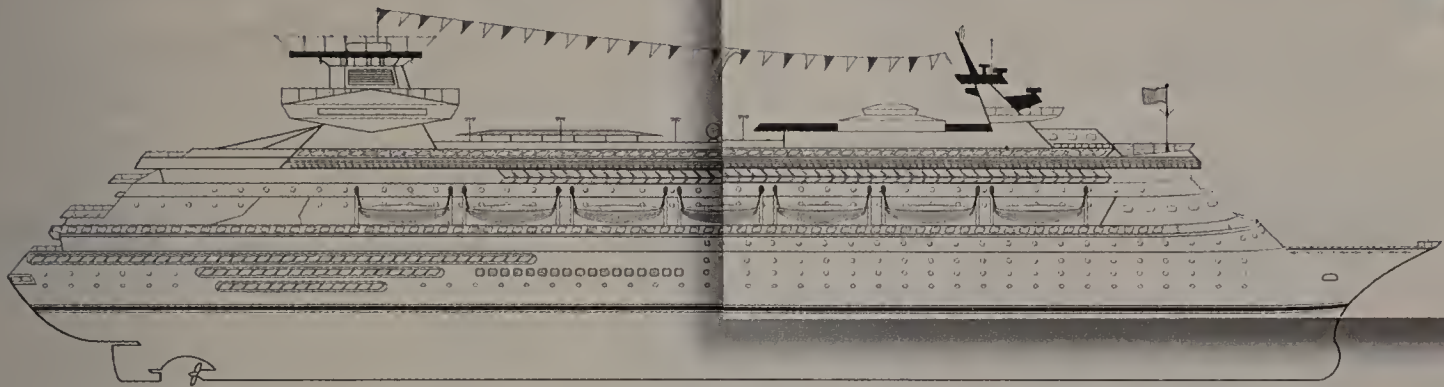
Any utility that stores old copies of a file needs a portion of a hard drive (or server, for network users) for storing the older versions. VersionMaster is no exception, although its compression option (which reduces a file's size by about 50 percent) reduces the amount of drive space needed. But if you have a group of people editing documents and repeatedly checking documents in and out of VersionMaster, you need a lot of drive space. Although the compression step does add a significant delay to checking files in and out, I recommend using the option to save space.

VersionMaster's interface could be easier to use. For instance, VersionMaster forces you into an involved sequence of mouse-driven commands (no ⌘-key shortcuts here) to check out anything other than the most recent version of a file. And VersionMaster does not let you delete old versions to save space in the archive—you can either delete all the files in a project or nothing at all.

VersionMaster's method of reporting changes to the archived files is barely adequate. When you check a file in, you're allowed to add comments in a special field in the database. Users can then scan the comments to see what's been done to the file. If you're interested in learning the exact details of which paragraphs or sentences have been changed, however, you'll need a program such as Advanced Software's DocuComp.

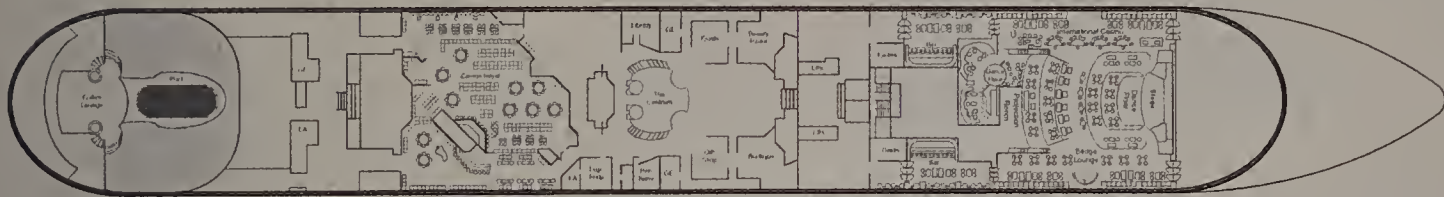
VersionMaster can be used to track file versions in a networked workgroup, as long as each user faithfully follows VersionMaster's check-out/check-in procedure rather than the usual Open/Save As procedure. I can recommend VersionMaster only for workgroups that will routinely follow the check-out procedures and that don't need detailed reports of the changes to a file. If your workgroup can't, you should wait for something better to come along.—DAVE KOSIUR

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Telecommunications Software

MicroPhone Pro

PROS: Powerful scripting language; customizable interface; includes send-and-receive fax software; good documentation; good value. **CONS:** Complicated TCP/IP tools; Loran interface not fully implemented. **COMPANY:** Software Ventures Corporation (510/644-3232). **REQUIRES:** Mac Plus; hard drive; System 6.0.5. **LIST PRICE:** \$295.



MICROPHONE PRO IS THE NEW high-end version of Software Ventures' outstanding communications package, MicroPhone. The all-you'll-ever-need MicroPhone Pro package includes dependable stand-alone send-and-receive fax software and an upgraded version of MicroPhone II, souped up with a set of tools for connecting with TCP/IP computer networks.

MicroPhone itself is largely unchanged in this version: minor bugs are gone and a handful of features have been updated. For example, MicroPhone now has 18 modem drivers (up from 15), and the program now supports Apple's internal PowerBook modems and a variety of new high-speed modems with built-in error-correction and data-compression features. MicroPhone continues to offer powerful scripting features for automating telecom sessions and a refined interface that can be easily customized.

The most significant part of the upgrade—what takes us from MicroPhone to MicroPhone Pro—is the addition of TCP/IP Tools, which enable you to connect your computer to a Transmission Control Protocol/Internet Protocol (TCP/IP) network. The tools include the required MacTCP system extension from Apple and the MP Telnet Tool, which gives the program the necessary instructions for connecting to a network using the TCP/IP protocol.

You establish a TCP/IP connection by opening the Communications Settings dialog box (accessed through the Settings menu in MicroPhone's main interface) and selecting Telnet from the Method pop-up menu. This causes a new dialog box to appear in which you enter the host's Internet Protocol address and set the terminal emulation. Once MicroPhone Pro connects to the specified host computer, the rest of the session runs like any standard modem connection.

Most modem users dialing into BBSs or other online services won't have to mess with TCP/IP, but those who need

that kind of connectivity will appreciate MicroPhone's scripting language features and well-designed interface. To use the TCP/IP tools, you must be connected to a network; Macs on non-TCP/IP networks, such as LocalTalk, require gateway hardware such as Shiva Corporation's EtherGate or Cayman Systems' GatorBox. The TCP/IP Tools documentation is clear and precise. That's a relief because configuring Apple's MacTCP is complicated and counterintuitive, and an incorrectly configured MacTCP can cause problems across a whole network. As long as you stay glued to the 80-page TCP/IP manual when installing the tools, you'll be fine.

The other big bonus in the Pro package is that it comes with a separate send-and-receive fax application for use with fax modems. STF Technologies' Faxstf enables you to send faxes at 200-by-200-dpi resolution from within any Macintosh application by selecting FaxPrint from the Chooser and issuing the Print command. Faxstf also offers customizable cover-sheet options, fax broadcasting to multiple destinations, multiple online phone books for autodialing, and the ability to schedule fax transmissions. You can view fax documents at 50, 75, 100, 200, and 300 percent magnification, and the Fax-Status DA makes it easy to monitor the progress of faxes you send and receive.

MicroPhone and Faxstf constitute a truly comprehensive telecommunications package. Still, one part of MicroPhone Pro is disappointing. Last year, Software Ventures unveiled Loran (Long Range Navigator), a module included with MicroPhone to provide a single interface for dialing into various online services such as CompuServe and GENIE. Initially, Loran's capabilities were limited to sending electronic mail to and from CompuServe and Software Ventures' own bulletin board—but more was promised in the future. Software Ventures originally said additional plug-in modules would be available by the end of 1992, but these are yet to materialize.

Even so, there's plenty packed into MicroPhone Pro. And here's some really big news: With the introduction of MicroPhone Pro, Software Ventures has slashed \$100 from the price of MicroPhone II 4.0, which now lists for \$195. Without the TCP/IP tools (needed exclusively for communications on a TCP/IP network) or the fax software (generally included when you buy a fax modem), MicroPhone II already offers more than most users need in a telecom program, so it's probably the best choice for most people. And at the new discounted price, it's also a great deal.—JOSEPH SCHORR

PowerBook Utility

CPU 1.0j

PROS: Single control-panel interface; accommodates multiple users; many invaluable modules; online help. **CONS:** Some modules of dubious utility; security features easily bypassed. **COMPANY:** Connectix Corporation (415/571-5100). **REQUIRES:** Mac PowerBook 100; hard drive with 200K free space; 2MB of RAM; System 7. **LIST PRICE:** \$99.



AS ITS NAME INDICATES, CPU (Connectix PowerBook Utilities) is a collection of utilities designed specifically for PowerBook users. A few of its 13 modules duplicate features of Apple's standard PowerBook software, but most offer new or greatly enhanced functionality. Overall, the indispensable items easily outnumber the trivial.

Installation is as simple as running the Installer utility and entering your name to personalize the CPU control panel. Although CPU comprises many different utilities, you access all modules through the single control panel. CPU maintains preference settings that determine how the PowerBook behaves, so you can have certain settings in the office and different ones when traveling. CPU even accommodates multiple users, each with as many different settings as desired.

CPU's power management is its strongest feature. You can greatly extend battery life by specifying how long the PowerBook should wait before spinning down the hard drive, resting the processor, dimming the backlighting, and going to sleep. (The initial version of CPU had a nasty habit of putting the PowerBook to sleep in the middle of long downloads or disk writes.) Recognizing that the optimum time-outs differ depending on whether the PowerBook is running on battery or AC power, CPU lets you specify different settings for each situation.

I especially appreciate the user-configurable Hot Keys feature, which you can use to instantaneously spin down, sleep, and change backlight settings. There's also a key that flashes a large circle around the cursor, helping you locate it after it "submarines." There's even a Panic button that quickly hides whatever you are working on—or playing with—behind a graphic of your choosing. One nice addition would be a hot key to toggle into Rest mode to conserve power. Also, since I often forget which key combination does what, I wish Connectix would provide a

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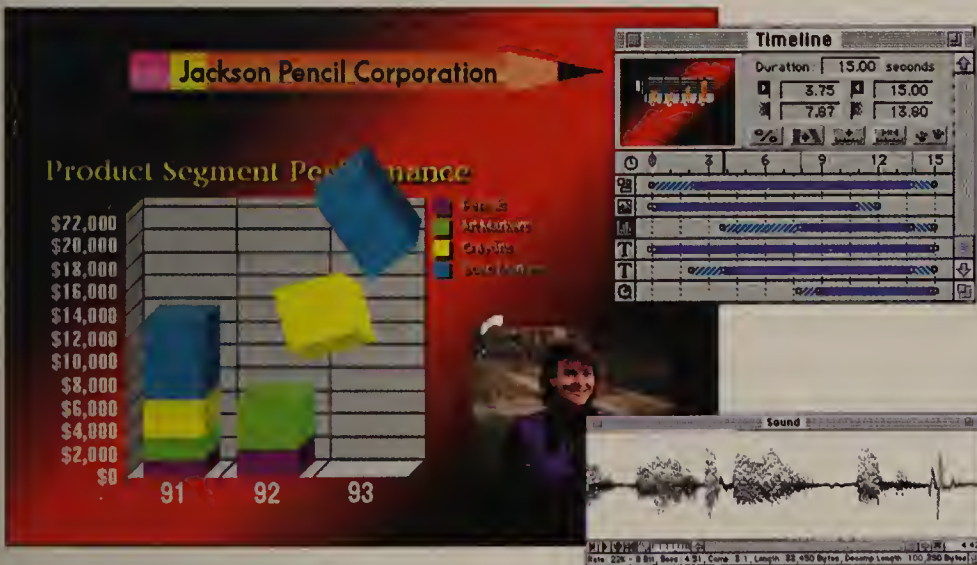
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way to print a cheat sheet listing all hot keys and their functions.

If you hate the trackball, you'll love Keyboard Power because it lets you access just about any menu or dialog box option with keystrokes. CPU automatically locates all of the options available at any given time and underlines the letters you must type in combination with the modifier keys of your choosing. Connectix should provide a separate Keyboard Power extension for users who want the same functionality on their desktop Macs.

The Indicators and Display modules present important information along the right-hand edge of the menu bar. For example, like Apple's Battery desk accessory, the graphic battery indicator shows the charge level, and it also provides a rough estimate of the remaining battery life (in time or percentage of power remaining) by monitoring your power consumption. Other optional indicators include date, time, speed of the processor, and icons warning when the PowerBook is about to sleep or when the hard drive is going to spin up or down. I think the Caps Lock indicator is worthless since you should know that key is depressed when everything you type appears in uppercase. Connectix allows you to disable the Caps Lock key altogether.

CPU can be set to request a password at start-up or upon waking up from Sleep. If you prefer, CPU can require you to click in a secret area of any graphics image (interesting, but more a gimmick than a needed gadget). Anyone can bypass both of these security features, however, by simply inserting a bootable System disk and restarting. If you need true security, I recommend Fifth Generation's DiskLock instead.

CPU's LCD Saver "conditions" the screen—by inverting black and white pixels during periods of inactivity—to prevent ghosting and frozen pixels. This isn't exactly entertaining, but according to Connectix, the liquid crystal display in the PowerBook requires a different kind of screen saver than the type traditionally used on phosphor-based monitors. Any screen saver is better than none at all, but I doubt LCD Saver is better for your PowerBook than Berkeley Systems' After Dark or Fifth Generation System's Pyro.

You can duplicate much of CPU's functionality by combining individual public-domain and shareware programs. But you'd have to put up with disparate user interfaces, inevitable compatibility problems, and multiple update hassles. Even at its full list price of \$99, CPU is a relatively inexpensive way to turn a mere PowerBook user into a full-fledged power user.—OWEN W. LINZMAYER

File-Synchronization Software

PowerMerge 1.0.2

PROS: Excellent file-handling; before-sync preview; single-direction locking; good online help. **CONS:** Potentially confusing interface; under licensing agreement buyer may make only two copies of application. **COMPANY:** Leader Technologies (714/757-1787). **REQUIRES:** Mac Plus; System 6.0.4. **LIST PRICE:** \$129.



JUST WHAT IS FILE-SYNCHRONIZATION software, you ask. Webster's defines *synchronize* as "to make synchronous in operation," and "to . . . arrange (events) to indicate coincidence or coexistence"—a pretty good description of PowerMerge. It updates selected files so that different Macs end up with identical versions of the selected documents. Automization, selective file transfer, and the ability to recognize conflicts (files that have the same name but different creators, creation dates, or file types) give file-synchronization software an advantage over dragging-and-dropping files to get the same versions on various Macs.

PowerMerge's three-step synchronization scheme is definitely convenient. Install PowerMerge on the Macs with the files to be synchronized, on each Mac select the files or the folder containing those files, and preview the files or folders selected. That's it.

You can name and save an unlimited number of synchronization setups. I have several since I sync many databases individually—unfortunately, my databases aren't organized in a folder.

PowerMerge's best feature is the Preview window. The Preview window compares the two folders you want to sync, and before synchronization, displays the folders' contents and indicates which of the selected files need to be updated, plus any files in conflict. You can resolve some conflicts from the Preview window by excluding or even trashing selected files. This approach is more practical than skipping over conflicting files and having you resolve the conflicts individually, as Magnet does (see *Reviews*, February 1993).

The Preview window's icons and keyboard commands let you easily trash old files, exclude files from syncing, or synchronize a previously excluded file. You can use the icons to navigate nested folders or move among files to be synchronized or from one conflicting file to another.

PowerMerge 1.0.2 allows you to synchronize the contents of the System Fold-

er. The ability to synchronize the System Folder is particularly useful for saving or transferring preference files or folders across Macs. You must specifically designate each file within the System Folder to sync. This extra step should help prevent inexperienced or frazzled users from inadvertently having two System files on their Macs.

Now the interface. PowerMerge uses a conceptual view called Left-Right. The idea is this: the Mac or folder with the preeminent files is located on the left. On the right is the Mac or folder with auxiliary files. Volumes update from left to right then right to left, unless you lock one folder. With a locked volume, PowerMerge synchronizes one-way instead of the normal bidirectional transfer.

Sounds straightforward, and many users find it easy; but it's really like a Rorschach test, a software inkblot in which some people see a coherent picture and others nothing recognizable. For those in the latter group, Leader has an additional interface, based on the 7.0 Finder, that is expected to ship in 1993.

Either read the manual and know for certain in which group you belong, or take the plunge. The interface does take getting used to, but it's hard to get lost when PowerMerge has only three steps, plus I mostly grasp this Left-Right business—although anyone who rides in my car may dispute that. When I did get confused, I used PowerMerge's online help. Only rarely did I consult the manual.

Interface aside, PowerMerge's biggest drawback is the licensing agreement, which limits users to two copies of PowerMerge per purchase, one for each machine. Those with simple-use needs won't be inconvenienced. However, if your needs are more complex—say, from one desktop Mac to ten PowerBooks, or one desktop to several file servers—PowerMerge rapidly becomes expensive. I don't consider myself a power user, but the licensing agreement immediately cramped my style, as I wanted to update two volumes—a file server and a SyQuest cartridge—from my file server. I would have needed to buy another copy of the program. Leader Technologies plans to offer multiuser copies and site licenses; users should call for pricing.

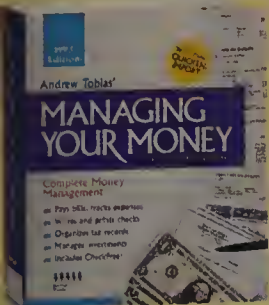
Don't get me wrong—PowerMerge is a fine product. I can definitely live with floating dialog boxes that don't quite stay put and the lack of a Cancel button on screen during the merge process (§-period [.] works but is not documented), but these are minor inconveniences when I look at how much easier my file-update process has become since switching to PowerMerge.—SUZANNE COURTEAU

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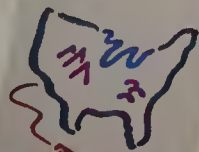
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Draw and Paint Program

ArtBeat Professional 1.0

PROS: Multiple layers; great autotrace feature; blends objects along a path. **CONS:** Limited color capabilities; no masking or gradient fills; rudimentary text-editing and core drawing capabilities. **COMPANY:** Pie Practical Solutions (201/902-9500). **REQUIRES:** Mac Plus; 2MB of RAM; System 6.0.3. **LIST PRICE:** \$249.



NOT TO BE CONFUSED WITH ART-Beats, the Oregon-based clip art company (or with *Macworld's* Art Beat column), ArtBeat Professional is an inexpensive paint and draw program imported from Europe that combines object-oriented and bit-mapped graphics, along the lines of Deneba's Canvas or Aldus SuperPaint. But while it's surprisingly fast and generally easy to use, ArtBeat lags well behind its American counterparts in the features category.

ArtBeat Professional offers separate drawing and painting layers, as does SuperPaint, but where SuperPaint supplies only one layer for each, ArtBeat lets you create as many as 255 layers and lets you mix up paint and draw layers indiscriminately. Unfortunately, all of ArtBeat's layers are

hampered by color limitations. Each painting layer can accommodate no more than two colors. Each drawing layer can take advantage of 256 colors, but you can't have more than 256 colors in the entire graphic. By contrast, SuperPaint 3.0 offers 16 million colors in both the drawing and painting modes. If you use Microseeds' Switch-A-Roo or Chris Sanchez's PixelFlipper, beware of changing screen depths while using ArtBeat. Any time you change the number of colors your monitor can display, ArtBeat restores the default system palette, thereby completely upsetting the color of objects in your drawing.

Though ArtBeat's painting capabilities are scant—more like those of Canvas as opposed to SuperPaint—ArtBeat offers a remarkable autotrace feature for converting bitmaps to objects. Not only can you filter out random pixels when tracing an image, but you can also preview the effects of different settings on the current selection and specify the drawing layer to which ArtBeat sends the finished object. The dialog box is a bit bewildering, but the feature provides a degree of control matched only by the stand-alone Adobe Streamline.

ArtBeat can also blend objects along a path. After creating a series of intermediate blends between two objects, you can bind those blends to a free-form path. This feature has been available to Microsoft Win-

dows users for a couple of years in Arts & Letters and CorelDraw. Unfortunately, ArtBeat lacks a masking function, so there's no way to fill objects with blends. ArtBeat also lacks gradient fill patterns.

ArtBeat's other features just don't cut the mustard. Bézier curves can't include cusp points—corners between curved segments, as in the horn of a crescent—almost entirely undermining their benefit over less sophisticated smooth polygons. When you edit smoothed polygons, ArtBeat displays them with straight sides, making it nearly impossible to predict the results of your edits. You can't append points to the end of an open path, you can't open or close existing objects, and you can't change the identity of existing points. Text isn't much better. You can bind text to a path, but you can't kern characters, you can't justify a paragraph, and you can't adjust leading.

None of this is to say ArtBeat is awful. The interface is straightforward, the documentation is well translated, and the program requires little memory. If ArtBeat had come along two or three years ago, I might have recommended it. But there's no denying the existence of at least two programs—SuperPaint and Event One's Michael's Draw—that offer many more capabilities for less money. Even the four-year-old MacDraw II, also less expensive, is a better all-around program.—DEKE MCCLELLAND

Organization Chart Program

OrgChart Express 1.0

PROS: Combines database and organization chart functions; solid array of design and adornment options; supports passwords; extensive help. **CONS:** Many ⌘-click and option-click procedures to learn; no field formatting. **COMPANY:** Kaetron Software Corporation (713/890-3434). **REQUIRES:** Mac Plus; 2MB of RAM; System 6.0.5. **LIST PRICE:** \$279.



THE LARGER THE COMPANY, THE more difficult it is to keep track of employees and their functional relationships with each other. OrgChart Express does the typical organization chart program one better by linking a database to the usual box-drawing functions.

Interconnected boxes (called tiles) show personnel relationships in these organization charts. Every person on a chart is defined as a subordinate, assistant, co-worker, or free agent, according to his or her relationship with the surrounding people. You add tiles by selecting an existing tile and then choosing a menu item such as Add Subordinate or specifying a number in a floating palette.

The program provides six predefined tile styles, but you are free to design your own. It's up to you which fields appear in a tile. Although you can set fonts, colors, and styles for each field in a tile, you cannot specify more detailed formatting options for any field other than the name field. You can't, for instance, set a "currency" format that will automatically include dollar signs and commas for a salary field. Each chart can contain as many tile styles as you like. You can also specify the way tiles are grouped; subordinates can be arranged in ten different patterns, for instance.

You enter information in a tile by typing directly on the face of the tile or by popping up the Single Record Editor, the program's database. Within the editor, you can page through records and display them in any order.

When there's turnover in a position or a new position is created, it's easy to move existing personnel into the open slots. Simply ⌘-click on the tile for the person you wish to move and then click on the destination tile. Personal information (the employee's name and phone number, for example) is transferred with the move to the new tile. Positional information, such as the position title and office number, remains with the original tile.

OrgChart Express is extremely flexible. Many of the program's functions can be

selected from tear-off palettes. Because a chart or its underlying database may contain sensitive information, the program offers two types of passwords: one for the owner and one for potential guests.

There are plenty of options for dressing up charts. You can select, for example, a different border and shadow style for each tile. Charts can include graphics, and program tools allow you to add text, lines, boxes, and arrows. You can also add color or shades of gray.

However, OrgChart Express is not simple. The key-combinations to do anything unusual, such as enlarging a data field in the Single Record Editor (press the option key while clicking on the field to be resized), require frequent references to the manual or to the extensive online help system.

Also, if you're the person charged with doing organizational charts in your company, you should think about getting a two-page display. Designing an org chart on a built-in 13-inch monitor is extremely difficult because of the constant need to switch among the screen magnification and reduction options.

Still, when you get tired of doing organization charts in your draw program, you should definitely consider OrgChart Express. Although it has a fairly steep learning curve, the payoff is well worth the effort.—STEVEN A. SCHWARTZ

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Railroad Simulation Game

A-Train

PROS: Great details; wonderful graphics.**CONS:** Relatively high learning curve; interface not sufficiently Mac-like. **COMPANY:**Maxis Software (510/254-9700). **REQUIRES:**Mac Plus; hard drive; System 6.0.5. **LIST****PRICE:** \$69.95.

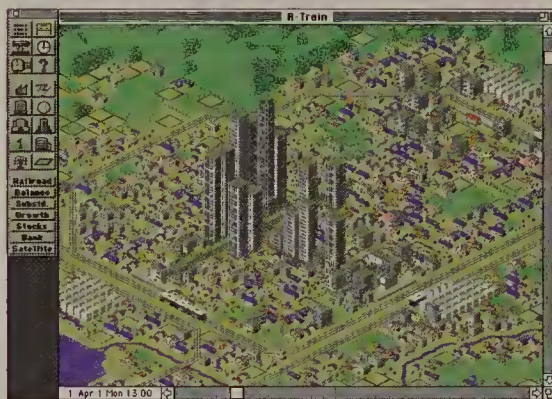
I AM A SIM NUT. THAT WORD PROCESSING, telecommunicating, and databasing I do is just a cover for my multiple virtual careers as a jet pilot, city planner, warrior, and paper airplane. So naturally I was thrilled to receive A-Train. This was a railroad simulator, and I love trains!

First let me praise some of what's done right. The graphics are stunning. The basic scenario opens to a breathtaking landscape: a sleepy suburb next to developing new rail lines and activity around them. The other scenarios, which depict a precarious empire of transportation, real estate, and stocks, are even more impressive. You view a seething riot of houses, skyscrapers, golf courses, stadiums, department stores, factories, and, above all, train lines chugging along. You can see how careful nurturing will cause a

bustling metropolis to spring from a bedroom burg.

As in other Maxis simulations, the detail is astonishing and often witty. A-Train's progress is marked by hours; the sky darkens every evening, and night falls. Fireworks explode in the summer, and on Christmas Eve, Guess Who rides by on his sleigh. The details that concern you more, however, involve the tracks you lay, and the stations, apartments, and commercial buildings you construct. If you do these things logically, the city thrives, as does your personal fortune. With the exception of sometimes-tricky track laying, everything works well.

A-Train is not merely a train simulation, but a financial one as well. Unlike with



Downtown Reorganization This looks like a bustling metropolis, but your railroad is on the brink. First thing to do is lose that freight train on the lower left, which is uselessly piling up building materials.

SimCity, which it somewhat resembles, the goal is not developing an urban area with a happy populace, but becoming a magnate. Familiarity with spreadsheets and profit-and-loss statements is helpful. It's satisfying to see your bottom line grow, but the real thrill is watching the train lines grow, with areas around stations exploding with activity as a result of your planning acumen.

A-Train does have its downside. The program meets the Mac interface only halfway—you can't keep multiple windows open, and you can't get information about objects on the screen by double-clicking on them. A more serious limitation is conceptual. Perhaps because of A-Train's Japanese origin, the mind-set here is less the gritty gestalt of American railroading than the world of sleek commuter trains. If you lust for the former, I suggest a less artistic but equally entertaining simulation, Sid Meier's Railroad Tycoon, from MicroProse.

Finally, A-Train is a little slower than other Maxis sims and requires a good understanding of the ground rules before anything can happen. You'll have time to kill while your factories churn out building materials—I spent it usefully, reading *A-Train: The Official Strategy Guide* by Nick Dargahi (Prima Press, 1992). This guide, like A-Train's manual, is loaded with train lore that illuminates a charming and diverting simulation program.—STEVEN LEVY

Video Clips

Media-Pedia Video Clips

PROS: High-quality recordings; well indexed;some formats are SMPTE time-coded. **CONS:**Synchronized audio sometimes detracts from video; steep price tag. **COMPANY:** Media-Pedia(617/235-5617). **REQUIRES:** Mac II; com-patible VCR; digitizing board; QuickTime. **LIST****PRICE:** VHS \$195; S-VHS, Hi8, and 3/4SP

\$295; BetaCamSP \$495.



LOOKING FOR A CLIP LIBRARY OF QuickTime video sequences? With QuickTime in a state of flux, now is probably not the best time to invest in digital movies. If you have a QuickTime input device, such as SuperMac's VideoSpigot or Radius's VideoVision, you're better off recording from stock video footage. That way, the next time Apple upgrades QuickTime's play speed, frame size, or compression capabilities, you can upgrade your movies by simply re-recording them.

The trick, then, is to locate stock footage. If your local library has a video department, you can probably find a tidy sum of sequences in the public domain. But even assuming that you find what you want,

you're not guaranteed quality. Most library videos play as if they spent their formative years strapped to the front of bumper cars. A more reliable, and more expensive, solution is to purchase a collection of public-domain footage, such as Media-Pedia (as in *encyclopedia*) Video Clips.

Media-Pedia contains 57 minutes of stock footage—the kind of stuff you'd spend hours trying to piece together on your own. More than 150 segments are included on a single videotape, offered in a variety of formats, everything from standard VHS to BetaCam. Covering the entire twentieth century, most of the sequences are from the thirties, fifties, and seventies (the eighties are remarkably underrepresented).

In addition to listing sequences in the order in which they occur on tape, the manual contains alphabetical and chronological indexes, perfect for locating a quick flick. The BetaCam and 3/4SP formats include SMPTE time codes; other formats are indexed by time in minutes and seconds. If your VCR provides some other form of counter, you'll have to jot down the sequence locations manually.

The sequences range from unremarkable (flybys of fields and orchards) to dramatic (tornadoes ripping apart homes) to genuinely funny (aggressive hordes of piglets making mom seasick in their efforts to nurse). Audio tracks have been tacked on to

most of the silent scenes. While most of the synchronized audio enhances the video—a scene at a playground aptly features the sounds of kids playing—other scenes would have been better left soundless. One sequence, a line of dandified men, is debased by an almost embarrassingly contrived laugh track. Nearly all the space footage features a constant *fwub fwub* that eventually bores holes in your head. While you can easily separate video and sound when recording movies to disk, Media-Pedia's licensing agreement prohibits you from mixing and matching the tape's audio sequences.


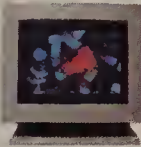
For \$195 you get the VHS tape and permission to include up to 15 minutes of Media-Pedia footage in any single production or presentation. The licensing agreement also warns that you can be sued by someone who appears in a sequence if you use the person's likeness in a manner that is libelous or intrudes on his or her privacy. (To its credit, the manual even provides a special section on libel and privacy law.) If you're used to paying \$20 for a movie at WalMart with a straightforward FBI warning—Record this and die!—Media-Pedia's price and terms may seem a bit daunting. But if you're serious about acquiring stock footage, Media-Pedia is a good value. I hope this idea will catch on and we'll see longer collections at more affordable prices in the future.—DEKE McCLELLAND

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Humor Collection

Just Joking 1.0

PROS: Wide variety of topics and sources; good interface; you can add or delete text to personalize program. **CONS:** Many of the entries didn't strike me as all that funny. **COMPANY:** WordStar International (415/382-8000).

REQUIRES: Mac Plus; hard drive; System 6.0.5.

LIST PRICE: \$49.



WORDSTAR INTERNATIONAL, PURveyor of such prosaic writer's aids as Correct Grammar and Correct Writing, now offers something on the lighter side: Just Joking, a HyperCard stack of around 2800 humorous quotations. According to the box, Just Joking is perfect for, among others, "a business writer who knows the value of a funny line." Because that describes me to a T (and since I seem to have contracted a near-fatal case of writer's block), I decided to utilize the program while writing this review.

Since this is a computer magazine, perhaps I should start off with some pleasantries about computers. I begin by searching the entire stack for the word *computer*. I get a few references in the program's credits, and

only one mention in a joke, which doesn't happen to work here. So I try a new tack. Looking under C in the list of 250 topics, I see 17 categories. Hmm, California... Capital Punishment... Celibacy... Crime & Crooks—if only I were writing about a lonely Silicon Valley hacker who goes to prison for his misdeeds. Alas, Computers isn't among the headings. But wait! There's a listing for Critics. I'm writing a review, so maybe there's something I can use under that topic. I click on Critics and am presented with three quotations, none of which works in this context. But a helpful note says "see also Journalism." I jump to Journalism, and copy and paste the following lines, from Nicholas Tomalin: "The only qualities for real success in journalism are ratlike cunning, a plausible manner, and a little literary ability. The capacity to steal other people's ideas and phrases... is also invaluable." Too true.

The "see also" note for Journalism suggests other topics, including Magazine Editors, Writers, and Writing. I glean a few witticisms, to wit: "Always remember that if editors were so damned smart, they would know how to dress," from Dave Barry (take that, you magazine editors!), and "A little inaccuracy sometimes saves tons of explanation," from Saki.

You get the picture. Just Joking can (sometimes) help you spice up writing or

speeches with clever sayings. My sentiment, should anybody care, is that no amount of joking can help a bad speaker or a bad writer, but perhaps some humor can help assuage the audience's pain. Just Joking offers a pretty good selection of sayings from a diverse group of humorists, comedians, philosophers, writers, and others, including Robert Benchley, Dorothy Parker, Milton Berle, Will Rogers, Erma Bombeck, Jackie Gleason, and Morris the Cat (I guess the last legitimately falls in the "others" category, but frankly, I didn't find his quip too funny). If the inclusion of contributors such as Charles "Mr. Yuks" Baudelaire or Bertolt "Laff Riot" Brecht puzzles you, keep in mind that some of the entries are ironic or cynical, rather than flat-out funny.

Just Joking can be a handy writer's tool—if it happens to cover the topics you're looking for. If it doesn't, you can always type in your own entries, making it into your personal humor database. Its format doesn't break any new ground (for an innovative look at humor, see Warner New Media's Funny, a CD ROM full of QuickTime movies of people telling jokes), but it's a serviceable collection. I'll leave you with some advice from Noel Coward: "Wit ought to be a glorious treat, like caviar; never spread it around like marmalade."

—ERFERT FENTON

Network Simulation

NetVirtual 2.0

PROS: Flexible. **CONS:** Slow; poor interface for setting up tests; cannot save custom settings; difficult to analyze results. **COMPANY:** Eclectec (408/462-2040). **REQUIRES:** Mac Plus; 4MB of RAM; System 6.0. **LIST PRICE:** \$995; \$4985 for unlimited nodes.



NETVIRTUAL IS A ONE-OF-A-KIND network-simulation product, but sadly it is incomplete. Designed for network administrators, NetVirtual lets you determine whether a new network design will work or whether changes to an existing network will adversely affect users. The program simulates time delays through the components (such as routers or file servers) of a network you have modeled and reports results back to each workstation (represented by a named icon in a worksheet).

However, NetVirtual does not simulate errors in the network or indicate incompatibilities between products. Nor does it report network failures during boundary conditions (periods of high and low network traffic)—a major shortcoming of the product.

But NetVirtual's worst problem is its interface: Mouse performance is poor and screen redraw slow; there is no library of custom icon settings; you cannot save changes to default icon settings; and the comparison tools for analyzing differences in workstation icons are inadequate.

Additionally, even with a relatively small network (approximately 50 nodes), NetVirtual users face the daunting task of assigning work loads for each workstation.

To simplify setup, NetVirtual lets you represent several identical workstations with a single icon. For example, you can represent five users in a workgroup with one icon by setting the icon's count to five. Because grouping users means fewer icons on the screen, redraws go faster. To group workstations, however, you must be sure that all of the users represented have the same type of computer, have hard drives with similar performance, and access the network the same number of times each hour. Representing a network with only a few icons may require unrealistic assumptions. Most network administrators manage large networks with many components and many kinds of users, so characterizing network use alone can be a huge task. You can use icons to represent individual workstations, but the more icons there are, the slower the performance.

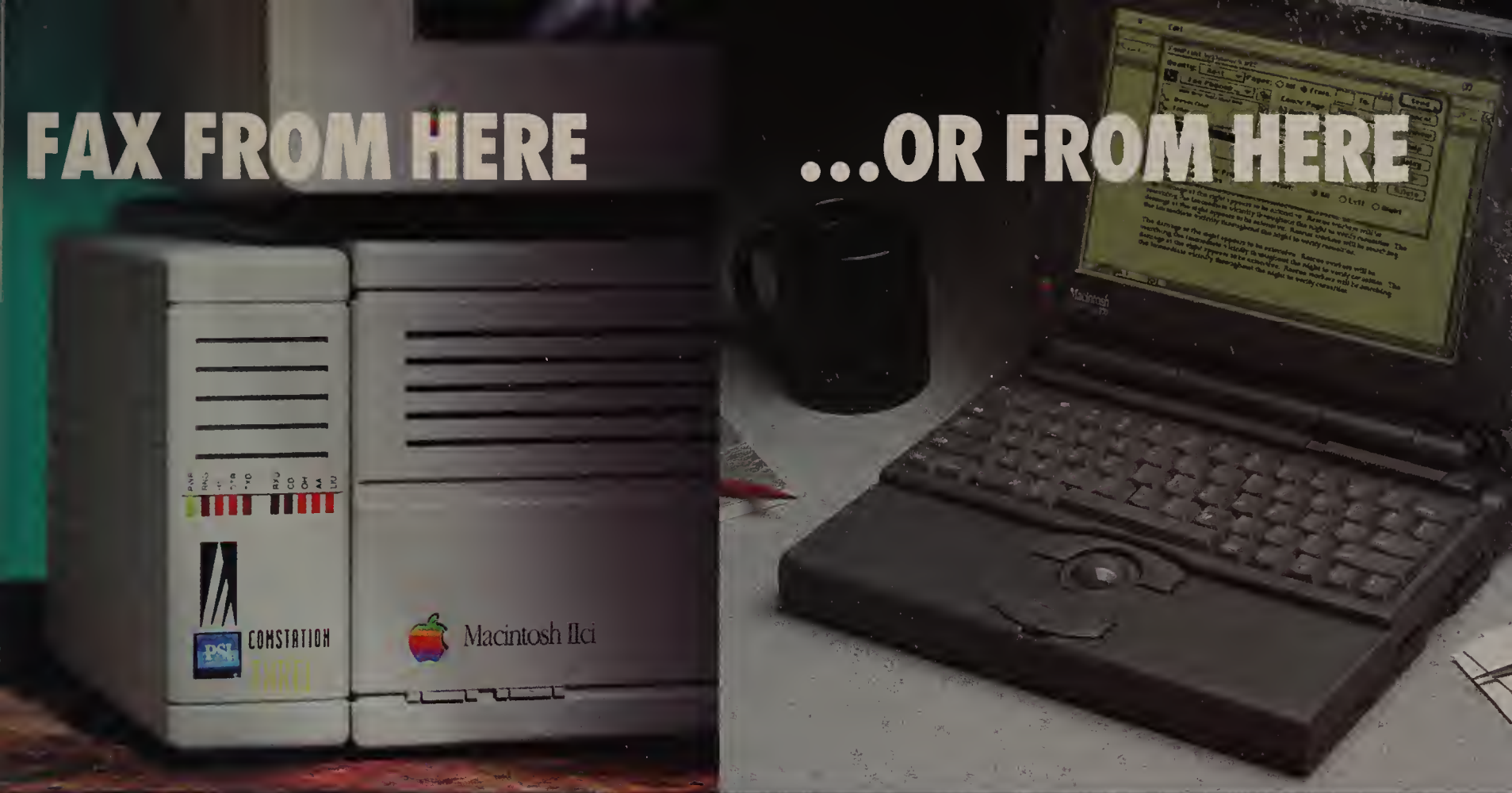
For my tests, I modeled *Macworld's* network of 70 users. After I generalized work-

groups into 12 icons, it took me hours to set the work load for each group. I had to click on and select from as many as 21 buttons and pop-up lists for each group. For my 12 groups, it took over 400 distinct steps to set network parameters! (Default settings for each icon can be changed, but changes cannot be saved, and it is impossible to save custom settings as icons in a library.) Additionally, the onus is on you to know exactly how workgroups use the network.

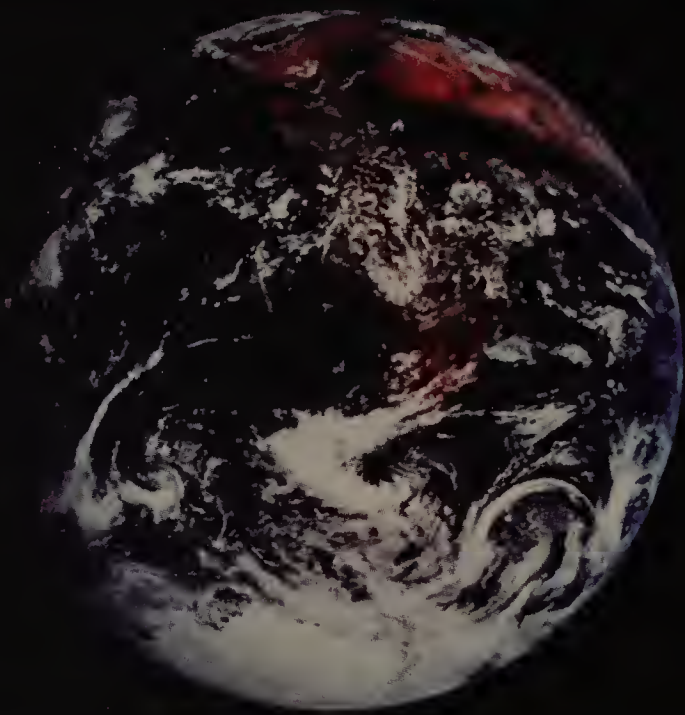
Only after hours of setup will your simulation report anything meaningful about your network. If you're like me, running a simulation is only useful if you can compare the network's resilience during periods of heavy use with its performance during light use. In NetVirtual, you can duplicate a worksheet and then compare the differences by workstation, by network, or overall. NetVirtual's graphs are difficult to use, and you can automatically compare icons within the same model, or icons with different names. The detailed reports generated by NetVirtual are long and cumbersome and would be more useful if they were organized into functional groups like workgroups or departments. NetVirtual needs dialog boxes that allow users to establish connections or view results in one step. Until Eclectec improves the interface, I will use my intuition and experience to design efficient networks.—TIM WARNER

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Interactive Storybook on CD ROM

Arthur's Teacher Trouble

PROS: Long-lasting entertainment; laughs for all ages; motivates kids to read. **CONS:** Hefty hardware requirements. **COMPANY:** Broderbund Software (415/382-4400). **REQUIRES:** Mac II; 4MB of RAM; CD ROM drive; 256-color monitor; System 6.0.7. **LIST PRICE:** \$59.95.



WHEN WE REVIEWED JUST GRANDMA and Me, Broderbund's first Living Book, last August, our popularity skyrocketed with the local under-ten set. So we naturally had plenty of volunteer testers for Broderbund's latest, Arthur's Teacher Trouble, by award-winning author Marc Brown.

Instead of just having young readers flip pages on screen, the computerized version of Arthur's Teacher Trouble invites them to explore and interact with the characters and objects in the story. A mouse-click almost anywhere on the screen causes something to happen (and not always the same thing twice, even for the same spot)—a hilarious animated sequence, a playful sound, a spoken phrase, or all three. Click on a trash can in the school hall and a pair of curious eyeballs peers out while a detec-

tive-movie-style musical theme plays. Clicking on the poster reading "Learn to Fly" on the bulletin board causes the poster to fold itself into a paper airplane and fly away, accompanied by a rock guitar riff. Find the right place to click in a later screen and the paper airplane flies through again. Meanwhile, the monster in the picnic basket will eat anything it can get its hands on. Arthur's Teacher Trouble is filled with so many things to explore that after several trips through the story, a young reader will still find surprises.

This Living Book is aimed at a slightly more sophisticated audience than the first one: the six- through ten-year-old crowd that can relate to Arthur's problems at elementary school. But our preschool testers had a great time with it, too—as did the older kids and adults. Like "Sesame Street," Arthur's Teacher Trouble has an occasional dash of humor to keep parents alert and involved. For example, clicking on the classroom globe causes it to spin to the theme of the soap opera "As the World Turns."

Arthur's Teacher Trouble is also designed to subtly teach while it entertains. For example, at one point Arthur studies a long list of words for a spelling test. Rather than just watch him study, the reader can flip through the list and click on a word to hear it spelled correctly and see a related animated sequence. You can set the pro-



The Power of Suggestion When one of the older kids tries to scare Arthur, an animated sequence illustrates what he imagines.

gram to read each page aloud; highlighting words or phrases also causes the computer to pronounce them. What's more, the program is bilingual; it can present the story in English or Spanish.

Some educators and parents fear that this kind of high-tech "edutainment" will turn kids away from books. Not so for our six-year-old neighbor Jacob. After playing with the program for an hour, Jacob asked to borrow the storybook that came in the package to read it with his dad. When he returned the book the next morning, he said he liked it *a lot* and hoped he could play computer again soon.—GEORGE AND BEN BEEKMAN AND THE SHOOBEDOOBOP SOFTWARE TESTING TEAM

Flight Simulation/Game

Hellcats Over the Pacific 1.0.3

PROS: Smooth graphics; good special effects; spiffy documentation. **CONS:** Compatible with only one external flight stick. **COMPANY:** Graphic Simulations Corporation (214/699-7400) **REQUIRES:** Mac II; 2MB of RAM; hard drive; System 6.0. **LIST PRICE:** \$69.95.



IT'S A SUMMER DAY IN 1945 AND YOU'VE just lifted your F6F Hellcat off the Navy carrier deck. A strip of deep blue Pacific lies between you and your Solomon Island objective. Suddenly, an enemy plane fills your windscreen, machine guns blazing. As it flies past, you quickly roll inverted and pull through to come up on his 6 o'clock.

It's not a dream. This is Hellcats Over the Pacific, a simulation of the F6F Hellcat that earned a reputation in the latter half of WWII as a fast, agile, and powerful fighter. Hellcats is an equally fast, agile, and powerful reproduction of the F6F and its Pacific-theater environment.

The Hellcats package includes a concise manual, a period inap of the Solomon

Islands, and one extremely classy bonus—a facsimile of the original Navy F6F Pilot's Handbook, with detailed operating checklists and cockpit photographs, a fighter-tactics tutorial, and an introduction to aircraft aerodynamics. Although warbird fanatics will appreciate the fighter-pilot arcana, the 120-page handbook is optional reading; the Hellcat manual gives the instructions you need to fly and enjoy the program.

Hellcat visuals are stunning. In the forward view, you peer over an F6F instrument panel and through a large windscreen. You can switch between left, right, and rear views with the arrow keys, and you can change viewpoints to such outside vantage points as the control tower, a chase plane, or even an enemy plane. In 16-color mode on a Mac LC the graphics are smooth and fast. To maintain that performance in 256 colors requires a faster Mac, but a IIci easily keeps up on a 16-inch monitor. The program adjusts to fill any size screen.

You fly using the mouse, the keyboard, or an optional Gravis ADB MouseStick (from Advanced Gravis Computer Technology), although the MouseStick limits the screen area to 848 by 848 pixels. Buttons on the MouseStick can be used to fire guns, drop bombs, or control throttle, flaps, and landing gear, adding realism. The instrument panel follows the actual F6F layout, with one concession—a radar screen,



Hit the Deck Landing on a moving aircraft carrier is just one of the challenges you'll face in Hellcats Over the Pacific.

nonexistent in the actual F6F, lets you more easily find and engage enemy aircraft.

You muster in at the rank of ensign and select one of eight missions, each with a dossier noting targets and other information. Hellcat keeps score as you do battle and promotes you accordingly. During a mission you encounter Hellcat's many special effects: digitized sounds for everything from engine noise to bomb release; selectable scenery detailing trees, clouds, and haze; and a bumpy ride when taxiing on grass. When you crash, a replay shows the disaster from outside the aircraft, down to the fiery explosion and resulting hole.

All in all, Hellcats is an exceptional flying experience.—MEL BECKMAN

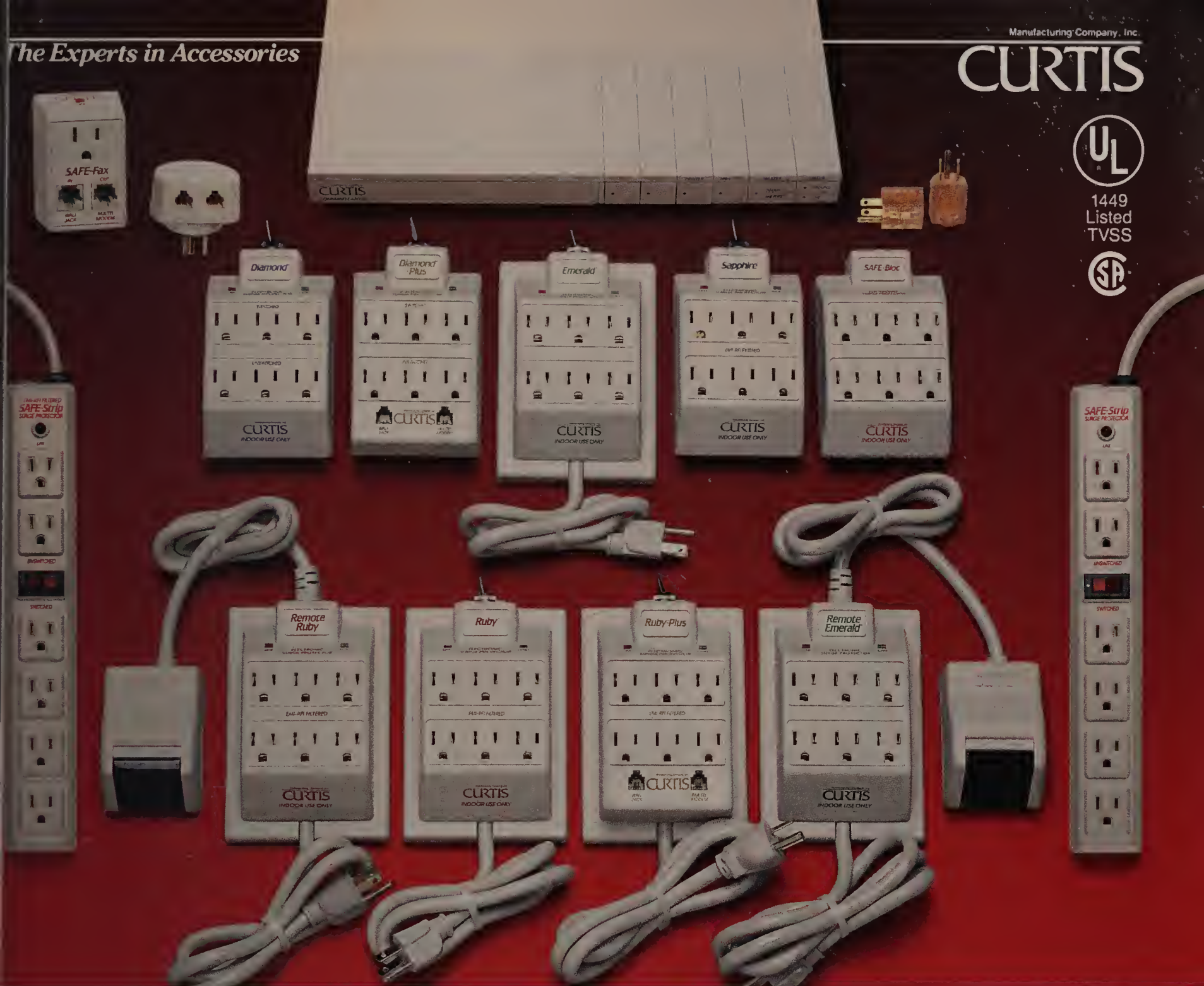
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Qualified Macheads are on hand to show users the tricks of the trade, and there are plenty of Macs provided on-site for impromptu practice sessions. Users try out new software for home and office, separating the quick from the dead, and getting expert critiques on a wide range of applications. In fact, there are so many experts at MACWORLD Expo, it's like you're hearing the word of G...(well, uh, you know what we mean).

In the end, it's only natural that an event as big and exciting as MACWORLD Expo would be an irresistible temptation to over 100,000 Mac enthusiasts in North America. (And it's no surprise that companies would practically part with their ribs to exhibit). True believers know that glory is never more than an upgrade (or two) away. And sticking with the same old program is almost a sin.



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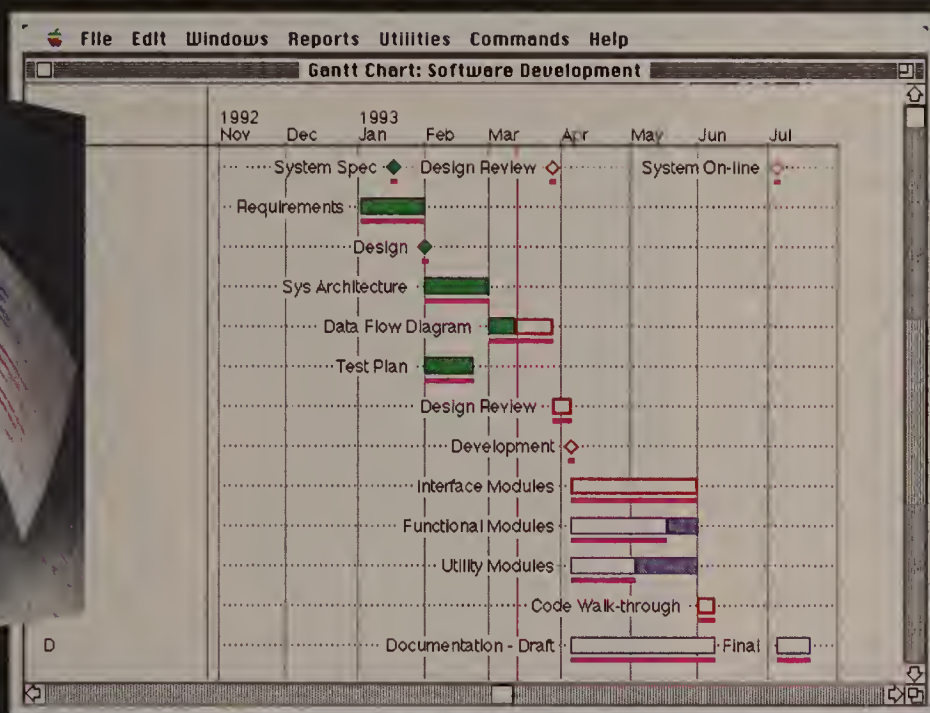
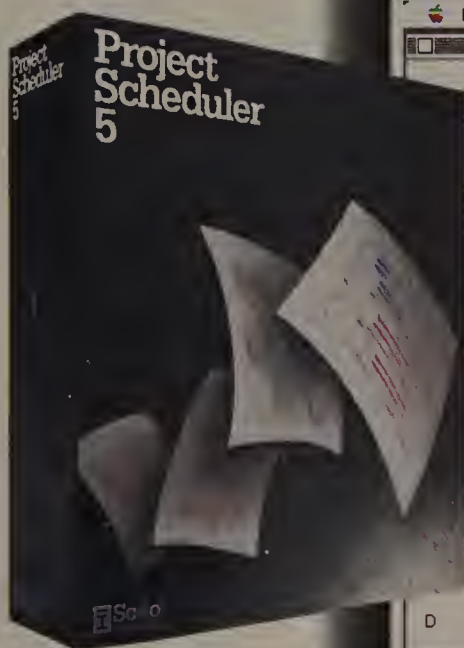
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Educational Game

The Secret Codes of C.Y.P.H.E.R.

PROS: Intriguing; unusual combination of educational information. **CONS:** Unescapable, repetitive animations; copy-protection scheme.

COMPANY: Tanager Software Productions (510/430-0900). **REQUIRES:** Mac Plus; hard drive; System 6.0.2. For color: Mac II or LC;

2MB of RAM; hard drive; System 6.0.5. **LIST**

PRICE: \$59.95.



CY.P.H.E.R. IS SHORT FOR COURAGEOUS young partners in hush-hush electronic radiotelegraphy. Yes, it's another educational game where the student belongs to an organization with a mysterious acronym for a name. This one sets out to teach an intriguing, if bizarre, series of facts including information on a variety of mammals, Morse code, American Sign Language (ASL), braille, and semaphores. Of course, along the way, the student is supposed to have fun.

When you begin, you have a certain number of energy units, depending on your skill level. All your actions use up energy

units, which are displayed through the watch icon. This icon contains your decoder tool and a button for saving or quitting. You also use the watch to review clues and, through the FunCyclopedia, to access a wide variety of information. There are minor flaws, including a button that clicks like a button but doesn't do anything else and some screens that carry the title "Even More Information" but are otherwise blank.

As you begin a game, you receive three contact sheets, each with a different address. A image of a city, with neighborhoods, appears on the screen. Each neighborhood has streets named after a different item, such as dogs, mountains, gemstones, and so on. Your job is to click on a neighborhood based on the addresses on your contact sheets. If you're correct, an agent gives you part of your cipher. You then see your three contacts, who tell you brief facts about a mammal.

The second part of the game uses those brief facts. Clicking on an icon of the screen takes you to the wildlife preserve, where it's your job to find the mammal described by the contacts. This is trickier than it sounds, because the facts are fairly obscure. Furthermore, an incorrect guess costs energy units. As you move through the wildlife preserve, you see pictures of the mammals, with their names underneath. Clicking on the name selects the mammal, and if your

answer is correct, you receive three more contact sheets.

Contact sheets in hand, you head back to the city and go through the same thing again. If you succeed, after your third trip you have all three parts of a cryptogram, and it's time to solve a puzzle. The puzzles come in English, the ASL alphabet, braille, Morse code, and semaphore. Unfortunately, the puzzles are scrambled letters. If you choose an unfamiliar alphabet, you have to unscramble the letters, as well as decode the message. A hint button replaces letters for you, but each letter costs one energy unit. Basically you have to use the hint button to figure out the cipher. I found that disappointing. And learning the alphabets from the ciphers seems close to impossible. The ASL alphabet appears as very small pictures of hands, and some letters are almost indistinguishable from one another.

Throughout the game there are brief animated sequences. They're nice, but nothing special; and there's no way to skip them or stop them once they've started. After you've seen them 50 times, they become a long, slow torture.

Some aspects of C.Y.P.H.E.R. are both interesting and educational: in particular, the FunCyclopedia and the information on mammals. But the ciphers themselves disappointed me, and the animated sequences almost drove me crazy.—WENDY SHARP

Financial Software

Compare-A-Loan 4.0.2 LoanLease Library 3.0.3

PROS: Compare-A-Loan accommodates variable rates and time bases. LoanLease Library has a huge variety of payment schedules, including skipping payments and computing penalties. **CONS:** Both have minor eccentricities. **COMPANY:** Softflair (612/894-3357).

REQUIRES: Mac Plus. **LIST PRICE:** \$79.95 each.



LARGE FLUCTUATIONS IN INTEREST rates over the last ten years have made gamblers out of the most security-oriented, conservative citizens. Whether you like it or not, simply buying a house means that you are personally affected by every move at the Federal Reserve Board; in effect, you've become a bond trader if you have any real estate at all. Even deciding whether to lease or buy a car demands a computation that includes interest and tax deductibility.

So while software for loan evaluation might seem to be an overly narrow focus, it turns out to represent a trivial investment compared with the amount of money at

stake in typical transactions. Softflair's two products for loan evaluation are oriented toward professionals (actually, they're better than the mortgage-calculation programs found in most real estate offices). The first program, Compare-A-Loan, is oriented toward home loans, and makes reports that compare payback schedules in columns. You can see, for example, whether you should choose to pay two origination points on a loan in return for a half-point break on interest; choose variable or fixed rate (you can enter different likely rate schedules for the variable); pick a bimonthly payment schedule instead of monthly; or go for the new 15-year mortgages made plausible by lower rates.

The scope of Compare-A-Loan may be understood simply by looking at the choices under the Payments menu: Graduated or Flexible, Principal Only, Skipped, Fixed Principal, Double Every Twelfth, Round-Up on Solve, and Balloon at Term—this goes far beyond what you can do conveniently on a calculator or even with an Excel template. All these options are explained clearly in thorough documentation (I didn't know Canadian mortgages were computed differently). Use of \mathbb{A} -key combinations is a bit inconsistent and you have to select Print from the File menu to get an on-screen report, but otherwise Compare-A-Loan is a model Mac program.

LoanLease Library is structurally similar, but it assumes that you are generating a loan or lease and need to keep track of payments. That is, the program generates payment schedules, but you are expected to enter "date received" for payments. Like Compare-A-Loan it can compute penalties for late and skipped payments, but it also allows schedules of fixed payments with variable lengths of payback time (as opposed to fixed-term mortgages). Although it's oriented to lenders, consumers can use it to generate leases for a Saturn or a Quadra 950 for tax evaluation of a lease/buy decision. As someone leasing equipment to others, you can use LoanLease Library to determine return on investment under different sets of lease terms, a complicated business if you are financing the equipment yourself. LoanLease Library is also well documented and easy to use, if you watch out for little eccentricities (in every other Mac program \mathbb{A} -V means Paste, while here it calls up the variable interest rate dialog box).

Both these programs are professional-quality financial software but are structured and documented so that mere civilians can use them. Softflair has done a good job of taking the mystery out of a confusing topic, and unless you live your whole life on a cash-only basis, you should take a look at Compare-A-Loan and LoanLease Library.—CHARLES SEITER

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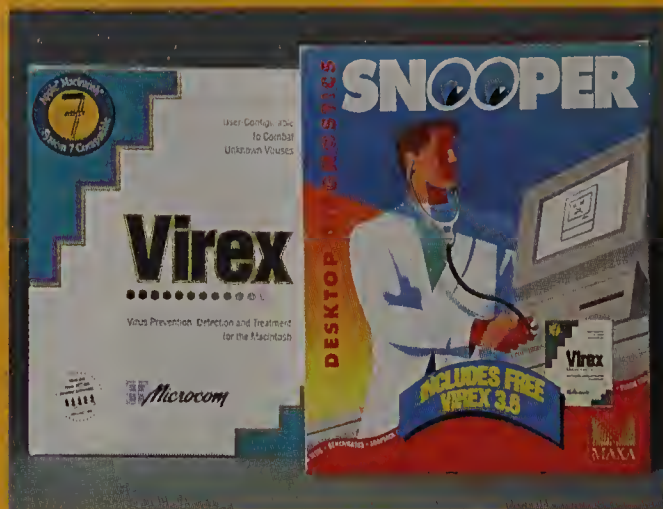
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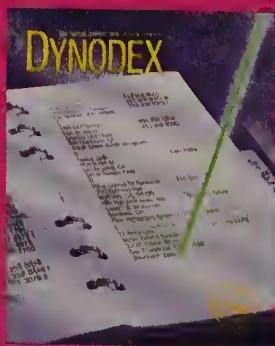
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\$35

MACKIDS

Jungle Quest



MacKids Jungle Quest

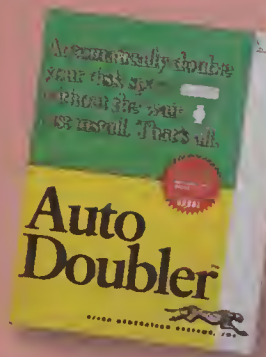
Help Solomon's lost treasure and rescue captive King in the perilous dark jungles of the mysterious world. Along the way your kids will conquer the challenges needed for success in elementary school. Ages 6-12 years. Publisher: Nordic Software

\$30

AutoDoubler 2.0

AutoDoubler is the easiest way to increase your hard disk capacity. It works in the background to automatically keep your hard disk compressed. It's lightning quick and completely transparent, so it won't interrupt your work. In fact, AutoDoubler's new patent-pending technique lets your Macintosh use files and applications while they are still compressed! It's fully compatible with almost all applications, desk accessories, and system extensions. Publisher: Fifth Generation UT10324

\$59



Bridge 7.0



Bridge 7.0 pits you and your computer partner against two computer opponents on your Mac. Improved color graphics and screen layouts, plus enhanced bidding and play, make it more fun. Your computer opponents have their own personalities, and digitized speech. Bridge 7.0 recognizes the stayman and blackwood conventions and allows you to adjust the style from conservative to aggressive.

Publisher: Artworx ENT0461

Also available:

Grail Quest-A graphic adventure.

ENT0262 \$19

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Softsync Publishing	
FIN0048 Accountant, Inc. 3.5	335.
WRO0057 ExpertWriter	29.
Teleware, Inc.	
FIN0087 M.Y.O.B. 3.0	109.
T/Maker Co.	
WRD0060 WriteNow Workshop	85.
WordPerfect Corporation	
WRD0041 WordPerfect 2.1	289.

COMMUNICATIONS & NETWORKING

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NET0076 DaynaPORT E/SE	149.

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NET0034 Timbuktu/Remote® 3.0	129.

Morph™

The hottest image effect of the nineties is now available on the Macintosh! Morph™ smoothly transforms one image into another, creating dazzling images and effects like turning last year's car model into this year's or a futuristic cyborg villain disguising itself as a valiant heroine. Morph™ is fast, easy-to-use, and is also QuickTime-savvy. **Publisher: Gryphon Software**



\$89

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MOD0085 Ultimate Home Office 24/96	489.
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NET0246 LANRover/L	389.
TechWorks	
NET0133 GraceLAN 2.0 50-user	279.

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ENT0289 CasinoMaster Deluxe Color Version	45.
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Optimum Resource, Inc.	
EDU0355 Stickybear's Reading Room	35.
Personal Training Sys. (Full line available)	
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Software ToolWorks	
MUS0092 Miracle Piano	349.

GRAPHICS & DESIGN

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FON0439 Adobe TypeStyler 2.0 w/ATM	127.
GRA0371 Adobe Premiere 2.0	429.
GRA0403 Illustrator 3.2 (w/ATM 2.0)	369.
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GRA0305 FreeHand 3.1	395.
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GRA0347 QuickTime Starter Kit	149.
Claris	
GRA0350 MacDraw Pro 1.5	275.
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GRA0412 Painter 1.2	299.
Gryphon Software	
GRA0378 Morph	89.
Quark, Inc.	
OTP0071 XPress 3.1	549.
Ray Dream	
GRA0383 addDepth	125.
Softkey Software	
FON0480 KeyFonts	49.
Softsync Publishing	
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INP0246 Microtek ScanMaker II	929.
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Publisher: Passport Designs

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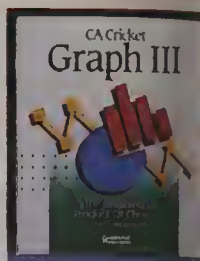
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Publisher: Computer Associates
BUS0262



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ORI0516 Spectrum/24 Video Mac II Card	799.

UTILITIES & PROGRAMMING

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Fifth Generations	
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MAXA Corporation	
UTI0337 Snooper Kit 2.0 w/ Free Virex	179.
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\$109



ALERT!

MAXA's ALERT!™ is essential Desktop Diagnostic™ software that lets you find the source of software conflicts and fix them! MAXA's ALERT! helps users find the cause of system crashes and frozen screens before they happen. MAXA's ALERT! diagnoses software on your Mac and reports actual and potential conflicts and problems. The program also consults a database of known conflicts reported by user groups throughout the world to further isolate possible problems. MAXA's ALERT! is fully networkable under System 7. With Alert's responder module, consultants, corporate MIS managers, consultants and corporate MIS managers and end-user, can diagnose and repair software conflicts over a network.

Publisher: Maxa
UTI0353

\$119

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Copy Utility

Copyright

PROS: Transparent operation; easy installation; numerous configuration options.

CONS: Can't copy sounds or fonts to System; can't copy DAs to or from suitcase files.

COMPANY: CSG Technologies (412/471-7170).

REQUIRES: Mac Plus; 2MB of RAM; System 7. **LIST PRICE:** \$49.



COPYRIGHT IS FOR PEOPLE WHO HATE to waste time—any time. This straightforward utility from CSG Technologies replaces the Finder's copy function, unobtrusively copying files to or from your Mac in the background, while you move on to more exciting things—like your work.

Copyright couldn't be easier to use. Each time you start to copy a file or folder in the Finder by dragging it onto an icon, Copyright automatically intercepts the Finder's copy function, transparently taking over the entire copying job itself.

With Copyright handling the copying in the background, you're instantly free to continue with any other Finder operations. You can open and close windows, trash files, or launch other applications. You can even

use the Finder to start another copying job, so you can copy multiple files and folders to different locations simultaneously. When copying is complete, Copyright can notify you by displaying an alert or by playing a specified sound.

As it unobtrusively grinds away at its copying business, Copyright also creates a Copy History—a detailed list of each file copied to or from your Mac, recording the time and date of each copy, as well as the source and destination disks.

You can determine exactly the level of detail you want the Copy History to contain. Copyright can be set to record the copying of all files, or just certain types of files, such as applications only or documents only. The history records the copying of folders only, or of individual files within the folders. You can also export the Copy History as a text file to any word processor.

When you are copying from hard drive to hard drive, Copyright copies files at almost exactly the same speed as the Finder. But if you perform other Finder functions or launch another application while Copyright is performing a copy, copying will be slower than normal.

When copying files to or from floppy disks, Copyright beats the Finder in speed tests. In one of my experiments, Copyright copied a 750K folder to a floppy disk almost twice as fast as the Finder. However, this

blazing speed comes with a price; unless you specify otherwise, Copyright simply writes files to the floppy disk without verifying the data (as the Finder does), so your copies are not as reliable as Finder-produced copies. You can set Copyright to verify when copying to floppies using the Verify Floppies option in the Preferences dialog box, but doing so slows copying down to almost exactly the speed of the Finder.

For a relatively simple utility, Copyright offers a generous number of options. You can set the program to launch itself automatically whenever you perform a copy and quit as soon as the copying task is complete. You can have Copyright notify you when a copy is complete with a selected sound or an alert display, or you can disable notification entirely, keeping the application completely in the background.

Copyright has its limits; it can't handle every copying task. The program will not work when copying sounds or fonts to the System file, when copying desk accessories to or from suitcase files, or when copying extensions and control panel devices to the System Folder icon, such as during the installation of a program.

Those limitations aside, Copyright is a genuine time-saver. For those who hate wasting time and can justify spending \$49 purely for the sake of efficiency, Copyright is almost irresistible.—JOSEPH SCHORR

Adventure Game

Space Quest 1:
Roger Wilco in the
Sarien Encounter

PROS: Excellent graphics; three window sizes; allows multiple saved games; money-back guarantee.

CONS: Manual-based copy-protection scheme; requires lots of hard drive space; no toll-free telephone hints.

COMPANY: Sierra Online (209/683-8989). **REQUIRES:** Mac II; 2MB of RAM; SuperDrive; 8-bit color monitor; hard drive; System 6.0.7. **LIST PRICE:** \$29.95.



STOP ME IF YOU'VE PLAYED THIS one before. When the original Macintosh version of Space Quest 1 was released in 1986, it was innovative and entertaining, but graphically a bit coarse. The revamped version of the adventure game, however, is nothing to sneeze at. It now displays highly detailed graphics in 256 eye-popping colors. Largely because of the new graphics, the game now requires more than 6MB of hard drive space—a far cry from the 700K the first release needed. You can select from three window sizes, depending on your monitor. The completely reworked inter-

face uses a pop-up icon palette for selecting commands. The adventure and the puzzles, however, remain unchanged for the most part.

You play the role of Roger Wilco, a janitor on a starship. Blaring alarms rudely awaken you from a nap in one of your favorite goof-off spots, the broom closet. It seems that a Sarien warship has attacked your vessel. The invaders have killed everyone aboard the ship and have made off with the Star Generator, a device that can be used for supreme good or evil, depending on whose hands it's in. Unfortunately, the Sariens, preferring the low road, intend to use the Star Generator for interplanetary conquest. The goal of the game is to recapture or destroy the Star Generator.

Your more immediate goal, however, is to find your way past the robots that the Sariens left behind to search for survivors—you, for instance—and get off the ship. As the computer-controlled clock on the wall reminds you, less than 30 minutes remain before the ship self-destructs.

Arcade skills play little part in Space Quest 1; instead, your head tends to be more important than your hands. The puzzles range from the obvious to some real head-scratchers. For the most part, though, even players who have never before tackled an adventure game will complete the game easily. (Sometimes there are several ways to

get past obstacles—including avoiding them.) Be sure to save your games frequently (you can save as often as you like).

There is no copy-protection, per se, but you need information from the manual at several points in the game. Game hints are available by mail, from Sierra's BBS, or through most major online information services. If you want help over the phone, though, you must call a special 900 number at 75 cents for the first minute and 50 cents each additional minute.

Stunning graphics, excellent sound effects and music, and humorous dialogue all help make Space Quest 1 a standout among Mac adventure games. Nevertheless, if it's not the game for you, Space Quest 1 comes with a 30-day money-back guarantee.—STEVEN A. SCHWARTZ



Space Bar To initiate an action—taste or smell an object, for example, or speak to a character—you click on an icon in this pop-up menu palette

Personalized Handwriting Font

Personal Font

PROS: Characters have clean lines; company proportions all characters by hand. **CONS:** Lacks the variability of natural writing. **COMPANY:** Lazy Dog Foundry (612/291-0306). **REQUIRES:** Mac Plus; System 6.0. **LIST PRICE:** \$199.99; full 180-character set \$499.99.



MRS. SARGEANT, MY FIRST-GRADE teacher, will not be happy, but I think that handwriting can be too neat. Artful handwriting has been an active pursuit of mine since grammar school. But despite sporadic success, my handwriting always has two distinctive features: it is recognizable as my handwriting, and it is irregular! Two weeks after I sent my three-page form to Lazy Dog Foundry, I found that the Type 1 font I received back is neither. It lacks the slant, the flair, and more important, the inconsistency that identifies my writing.

Don't misunderstand, Personal Font is very good at what it is. On my first print, I saw only two problems with the font that were not design constraints imposed by creating the Personal Font as a Type 1 file—single and double quote marks did not print.

The Lazy Dog Foundry designer (each font is "designed" by a pro) changed my *o* and *a* so that they could blend into other letters (one of the constraints imposed by Type 1); most of the other letters did a fair job of matching my handwriting (see "All in Your Connections").

A personal handwriting style is difficult to capture in a Type 1 font. These fonts have fairly rigid structures for characters and the spacing between them; a Type 1 handwriting font does not look handwritten. Handwriting has random inconsistencies—for example, the way you join letters together or the flourish you add to the end of a word. Since handwritten letters, especially cursives, always vary, Lazy Dog Foundry's Personal Font omits a vital element of simulating handwriting.

Signature Software's PersonalFont, which I reviewed in the December issue of *Macworld*, achieves the randomness inherent in handwriting by using the Type 3 format. Unlike Type 1 fonts, Type 3 fonts can incorporate additional PostScript code to make changes in letters based on their rela-

tion to other characters or words. However, that font lacks the evenness and clean line of the Lazy Dog Personal Font (see "Mano a Mano").

Lazy Dog's characters—even capital letters and punctuation marks—have been adjusted to be the right size relative to other characters.

So, the bottom line. If a clean, professional personal font is what you seek, Lazy Dog Foundry's Personal Font is worth the price for a Type 1 font. But if a font faithful to your handwriting is what you desire, look elsewhere (alternatively, try a Mont-Blanc).—TIM WARNER

Mano a Mano Signature's letters (top) have variances that mimic reality, but Lazy Dog's letters (middle) are much more clean and even. (My original is the bottom line.)

All in Your Connections To make connections to all characters, the lines that lead into and trail out of the *o* in this example are fixed to the baseline.

Utilities Package

Super 7 Utilities

PROS: Settings can be linked to specific programs; flexible launching options. **CONS:** Expensive; Printer Picker recognizes only network printers. **COMPANY:** Atticus Software Corporation (203/324-1142). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 7. **LIST PRICE:** \$99.95.



SUPER 7 UTILITIES IS A PACKAGE OF seven extensions that add a little ease of use to System 7, saving the lazy user some mousing around.

Mighty Menus lets you change any normal menu into a tear-off one you can move anywhere on screen. This is especially helpful for menus that you use often during a computing session, such as a Font menu in a word processor or page-layout program. It is the only module that is not System 7-specific, requiring System 6.0.4 or later.

Desktop Extras adds an Extras menu to the Finder's menu bar, with commands for copying, moving, trashing, or making aliases for selected files, folders, or disk icons. Desktop Extras' big advantage over Finder procedures is that it pops up a dia-

log box that lets you select the destination folder for each item and rename the destination item. Desktop Extras also keeps track of folders you choose as favorites so you can quickly designate a destination without navigating the folder hierarchy.

Printer Picker scans your system at start-up looking for installed network printers and then places their names in a menu at the right side of the Finder's menu bar. Using the menu or a \mathbb{H} -key equivalent Printer Picker assigns, you can direct a print job to any printer on the network without opening the Chooser. Unfortunately, Printer Picker ignores printers not connected to the AppleTalk network. An option allows you to link an application with a particular printer so that, for instance, documents automatically go to the LaserWriter IINTX down the hall.

Helium Pro lets you toggle balloon help on and off with a keyboard shortcut. A second key combination activates balloon help temporarily, as long as you hold the keys down. You can also change the font and size for all balloon help messages.

Speed Beep Pro creates a new menu that enables you to change the volume of the Mac's speaker without opening the Sound control panel. Speed Beep also randomly selects the sounds that signal errors, choosing them from the sounds installed in the System file or in an optional Sounds

folder. All sounds play in the background, so you don't have to wait for lengthy sound segments to finish before responding to the error. You can link sound settings to specific applications, but you can't select different sounds for different errors.

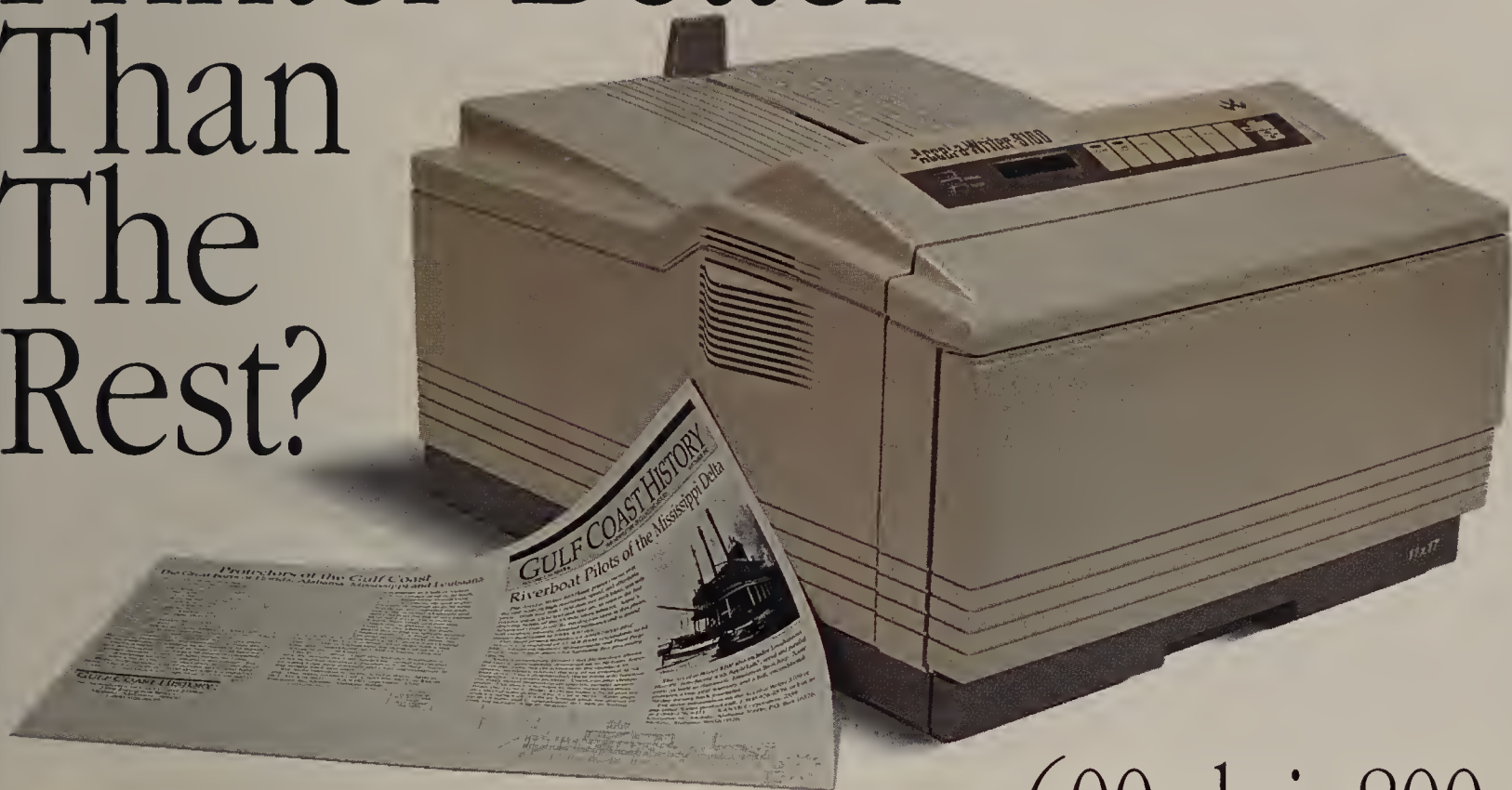
Trash Alias is an alias tracker. Whenever you throw out a file or folder that has an associated alias, Trash Alias displays a dialog box asking if you also want to throw away the alias.

Super Comments modifies the File dialog box so that whenever you open or save a file you can see any comments that you've entered for the file. On a Save or Save As, click on a Comments button and enter new comments for the file in a standard text edit box. If you encounter a conflict with other programs that modify the Save dialog box, you can define a list of applications whose File dialogs shouldn't be modified. Super Comments also addresses a major system software shortcoming: rebuilding the desktop no longer deletes file comments.

The Super 7 Utilities all work nicely, but what they do isn't essential and may overlap with the capabilities of utilities you already have, such as DiskTop or QuickKeys², both from CE Software. Whether or not they're worth \$100 to you depends on how many of the functions you already have and how badly you want the others.

—STEVEN A. SCHWARTZ

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Logic Game

Super Mines 1.0

PROS: Easy to learn; 84 difficulty levels provide long playability; not copy protected. **CONS:** None. **COMPANY:** Callisto Corporation (508/655-0707). **REQUIRES:** Mac Plus; 1MB of RAM (2MB for System 7 or MultiFinder). **LIST PRICE:** \$49.95.



OOM! "DIDN'T EXPECT THAT ONE. Let's see . . . two mines around the 2, three mines around this 3, and four mines around the . . . wait, that's a 5. Good thing I still have four minesweepers!"

In Super Mines, a great game for passing time or relaxing, you're part of a group of minesweepers combing a field chock-full of mines. In the beginning, part of the field is uncovered. Numerical clues indicate the locations of the mines. Using the clues, you map the rest of the minefield, marking suspect sectors with flags. If you make a mistake and uncover a bomb, you lose a minesweeper. Every time you clear a field, a minesweeper is added. (Each game starts with a platoon of five minesweepers.)

Work fast. A fuse burning around the screen indicates how much time you have

remaining. Fast and furious play is rewarded by treasure hidden in the grid—sometimes it's extra points and sometimes it's extra minesweepers. If you make lots of mistakes, the extra minesweepers let you keep playing. If time runs out, however, you lose your minesweeper and start over with a new minefield.

Although Super Mines is not really a puzzle game, it's a true brain-twister that requires a logical approach and fast thinking. The less difficult (or at least more predictable) Mini Mines mode is a good place for the wary to get lots of practice. And practice definitely helps.

After you have mastered the basic grid form, Super Mines keeps things interesting by challenging you with different grid patterns, such as hexagons or parquet (the



Continually Challenging If a standard grid is not enough, Super Mines mixes in alternate patterns with obstacles that test your fortitude.

toughest), and with obstacles, such as walls, without changing the basic game. After completing a few fields, you are promoted to a new rank. Each rank is a little harder, until you reach the final rank, 21, General of the Army. And if that is not enough, there are four skill levels, from easy to brutally hard.

The harder skill levels contain more bombs in the same space. Obviously, you play more cautiously when there are more bombs to avoid and map. But Super Mines forces you to face your fear by setting shorter time limits for the higher-level fields. On fields where you will be promoted, the time limits are short even on the lowest skill level and are painfully short on the hardest level. I had to cheat by making judicious use of the Save Game feature to make it past Private in the hardest level; the game doesn't allow self-promotion.

The depth of the difficulty levels is not immediately obvious. When I first sat down to play Super Mines, I thought it was too easy. I had already played a shareware version, called Minesweeper, available on DOS and Unix machines. As my skill level increased, however, the game became much more intriguing.

I recommend Super Mines. If you like games of logic and strategy, this one is sure to challenge your mental agility and physical dexterity.—TIM WARNER

Puzzle Strategy Game

Cogito 1.0

PROS: Enough levels to keep you going for years; real brain-twister. **CONS:** Black-and-white version seems like an afterthought; no help or clues provided. **COMPANY:** Inline Design (203/435-4995). **REQUIRES:** Mac Plus; hard drive; System 6.0.5. **LIST PRICE:** \$59.95.



T IRED OF TEXT ADVENTURES, SHOOT-'em-ups, and treasure hunts? So am I; that's why I decided to give Cogito a try. Cogito—pronounced like *cogitate*, only ending *oh* not *ate*—is played on a square grid made up of colored tiles, with movement arrows bordering each row and column. You use the arrows to move the tiles; the goal is to replicate the pattern shown in a small box in the lower right-hand corner of the Cogito screen.

If you think a game based on pattern recognition would be b-o-r-i-n-g, read on. Cogito adds a deviously simple twist that makes this baby a real brain-buster. As you reach higher levels, Cogito deletes arrows from rows and columns and changes some arrows' functions to move different lines or to move more than one line at a time. As if

that weren't enough, the pattern you have to re-create changes from an easy square, to triple bars, to vaguely heraldic patterns quartered with different designs, to random patterns of many shapes and colors.

Each level above level one has a unique, nonsensical password. Once you write down the password—and you'd better write it down, because there's no way to get it again without completing the level a second time—you can play that level again by opening a new game and typing the password.

If you find yourself stumped on a level, take a time-out and try a new background from the four that Cogito provides: an alien-damaged spaceship; a stellar view; a kiddy background of bright, happy colors and childish ornithopters; and LudyLand, a Lego background.

You have a monochrome monitor, you say? Too bad, because all you get is one background reminiscent of stucco, sized to fit a 9-inch screen. A handful of shapes—diamonds, bombs, hearts, spheres—differentiate the tiles.

The manual is a brief six pages—so brief, in fact, that it has no hints. A help or hints option didn't make it into the Cogito application, either. The manual says that "the tensions of the day dissipate as you are drawn into the ever more engrossing puzzles," but without any help or clues I often felt like smashing my monitor screen. How-

ever, one evening in a frustrated fit I called Inline Design at around 9:30 and got someone to give me the password to the next level (he himself hadn't done the level that stumped me). Inline Design offers support and help via America Online.

This is a minor point, but somebody needed to tell the folks at Kalisto, the French developers of Cogito, that going through the introduction sequence each time Cogito opens is irritating. It takes three mouse-clicks to move past three pointless screens before the game begins. Also irritating, and not so minor: saved games don't always open from their icons. I could only open saved games once Cogito was up and running.

Cogito has 120 levels, enough to keep even a Rubik's Cube genius busy quite a while. The game also provides several avenues of competition. An information panel above the playing grid has a clock that marks time spent on each level. Do you want to race the clock? Maybe you'd rather go against the computer and complete the pattern in as few moves as possible; the information panel also shows how many moves you've made and displays the number of moves the computer took to scramble the pattern. You can go for endurance—try to reach level 120. Or just relax to the soothing music of Cogito and play for the fun of it.—SUZANNE COURTEAU

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April Foolishness

BY DAVID POGUE

INTERESTING BIOLOGICAL FACT: evidently, the chromosomes that determine wit and Macintosh programming skills in humans are mutually exclusive. Here's the world's most creative computer, and April 1 is approaching—the perfect opportunity to explore the world of mirth-making, fun-loving, prankster software—and the only shareware programs in the prank category are about as witty as knee surgery. One displays a fake message that the system has crashed. Another displays a fake message that it's erasing your hard drive. A third scrambles your typing. Ha ha.

I've got a better idea: let's forget about playing jokes on other people and focus instead on stuff that makes *you* laugh. The Macintosh world has done much better in this category, as you're about to find out.

Totally Rad Mac Programs

THE LATEST RAGE IN MACINTOSH BOOK publishing is to scrape together a bunch of shareware programs and sell them as a book-disk combination (the book contains instructions). For Macintosh users with neither a modem nor a local user group, I guess these \$20 or \$25 books make sense; otherwise, you can usually get the same stuff directly from America Online or CompuServe for less money.

The exception—a standout in the shareware-book field, if you ask me—is Owen Linzmayer's *Totally Rad Mac Programs* (Sybex, \$19.95, 510/523-8233). Many of these 20 programs strike me as little-known gems. As in any book-disk combo, some of the stuff is redundant, not for everybody, or good for only a one-shot chuckle. And some of the included programs aren't funny (or even "rad") but are useful—there are shareware lookalikes of Berkeley Systems' After Dark (a screen saver) and Thought I Could's Wallpaper (a desktop-pattern editor), and a sampler of 'Star Trek' sounds.

But Kilroy (see "Kilroy Is Here"), while slightly buggy, is continually enjoyable (and useful on a PowerBook, where Kilroy's pointer-pulled pupils help you find a cursor that's disappeared on the limpid LCD screen). The Ripper tears a window in half, with a horrifying ripping sound, when you press a key. And 99 Bottles is positively hilarious. In a halting,

deadpan voice, it sings "99 Bottles of Beer on the Wall." Over and over and over, all the way down to one. You can even change the number of bottles. Try typing 9999999999. I defy you to keep from laughing when your computer actually sings the words "Nine billion, nine hundred ninety-nine million, nine hundred ninety-nine thousand nine hundred ninety-nine bottles of beer on the wall..." Good thing you can choose Quit at any time.

Talking Moose 4.0.2

THIS GUY IS STILL AROUND, AND HE'S still funny. If you don't remember, Talking Moose is an animated cartoon critter who appears after a specified period of inactivity, in his own little 2-inch window, and stays just long enough to mutter some sarcastic comment like "We never go out anymore." Or "*Wie gehts*, snuggy-wuggy?" Or "You're getting sleeeeeepy..." Believe it or not, I've found that the Talking Moose is the first confirmation many new Mac owners feel that they've made a worthwhile purchase.

The Antlered One has had chronic incompatibilities ever since his original debut as shareware a few years ago (Baseline Publishing, 901/682-9676, \$39.95). Even today, he doesn't work on the Classic II or the Quadra, and he clashes with certain software. But there's something so absurd, so existentially freakish, about the mere presence of a moose on your screen, about his inexplicable Swedish accent, about the devil-may-care weirdness of his utterances, that—for a few weeks, anyway—it all seems worth it.

Funny: The Movie in QuickTime

I'M SURE ALL SORTS OF POSSIBLE uses for QuickTime crossed Apple engineers' minds when they dreamed up their on-screen digital movie format. But nobody could have envisioned this CD ROM disc from Warner New Media (818/955-9999; \$39.99; a CD ROM player, of course, is required). It's a collection of 100 jokes—or, rather, 100 short

movies, each showing a celebrity or Ordinary Person telling a favorite joke. Broadway lyricist Fred Ebb's contribution: "A man walks into a paper goods store, and says to the girl behind the counter, 'Do you keep stationery?' She says, 'For the first couple of minutes, and then I go crazy.'"

Sometimes the joke is funny. Sometimes it isn't, but the person telling it thinks it's funny, and *that's* funny. But the most interesting aspect of Funny is what you learn about joke-telling: how much of the humor comes from the gestures, the inflection, the attitude of the teller—something this QuickTime collection offers that no other medium can match.

I'm not exactly sure what you're supposed to do with the disc after you've heard all the jokes a couple of times; after all, most jokes' punchlines are built on the element of surprise. I guess you can do with the disc after watching it exactly what you do with a joke after hearing it: pass it on to a friend.

Just Joking

THE BACK OF THE JUST JOKING BOX SAYS: "If you like a good joke, you'll love Just Joking—the electronic library of jokes, one-liners, quips, and quotations by the funniest writers... in America." Not! Half the quips in this HyperCard stack (\$49; WordStar International, 800/523-3520) aren't funny. You get such thigh-slappers as: "Be quick, but never hurry" (John Wooden). Or: "To betray, you must first belong" (Harold Philby). And the astonishingly witty: "A winner never whines" (Paul Brown).

Maybe I'm unsophisticated or something, but even the Robin Williams quote featured in the Just Joking promotional material doesn't twitch the needle on my Mirth-O-Meter: "What's right is what's left if you do everything wrong."

So what's a speechwriter to do? One idea: spend one-tenth the money and get a good cross-referenced paperback book of humor. Another idea: if you have a modem, dial

continues



*Where
to find humor
in the
Macintosh
universe*

up services like America Online, where there are not only bulletin boards devoted to jokes, but even text files full of jokes. (I found a text file of 65 lawyer jokes. Q: What do you get if you send the Godfather to law school? A: An offer you can't understand.)

Wallpaper 1.02

WALLPAPER, OF COURSE, ISN'T A JOKE collection of any kind (Thought I Could, 212/673-9724). But its wittiness quotient wins it a place in this list of ideas for April Fooling. It's a collection of brightly colored, jumbo background patterns for your desktop. (You can, of course, also create your own.) I wondered what the point was of paying \$59.99 when there are shareware programs that do pretty much the same thing. I found out that the answer lies in Wallpaper's ready-made patterns, several of which are a delight. One of them turns your screen into a gorgeous torchlit brick wall. Another makes your desktop resemble the facade of an apartment building, whose flower boxes and weather you can change for each season.

If you're serious about April Fooling a friend, yet aren't quite sicko enough to inflict the fake erasing-the-hard-drive stunt, try the clever but nondestructive multiple cursor backdrop (see "Cursors—Foiled Again"). (You want *real* originality? They actually had the guts to call it Wallpaper and not WallPaper.)

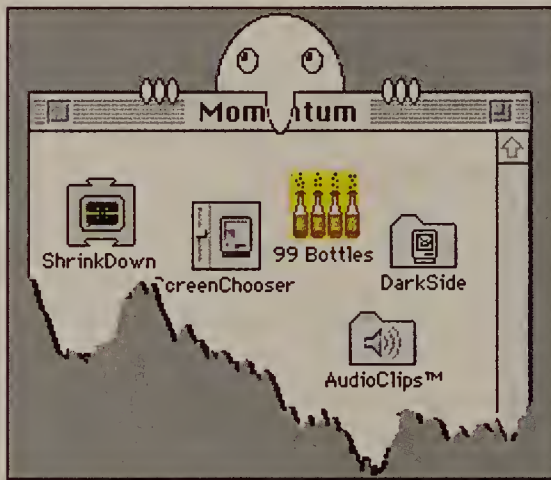
NetBunny 2 1/2

THE ONE. THE ONLY. THE CLASSIC. YOU drop the NetBunny system extension (free) into each Mac on a network. Then, when you're ready for the hilarity to begin, you launch a little trigger program called StartWabbit. And suddenly the NetBunny—an animated, colorful rip-off of the "Still going! . . ." Energizer battery TV mascot—parades across the bottom of your screen, banging away on his big bass drum. When he reaches the edge of your monitor, he plods directly onto the monitor of the next Mac on the network, and so on, until he's made his startling appearance on every screen.

The joke is brilliant, but you'll find this hare raising some issues. For example, NetBunny requires color Macs, and prefers System 7 with plenty of memory. Second, the wonderfully lighthearted people at Eveready told author Dean Yu that he's infringing copyright, or something, and ordered him to stop distributing NetBunny (although it's still available on America Online and CompuServe). And third, for some inexplicable reason, actor Leslie Nielsen's face has been pasted over the bunny's visage, somewhat confusing the issue and diminishing the impact of



Cursors—Foiled Again The personality of Wallpaper, the desktop-pattern-editing program, can be elegant, vibrant, scenic . . . or prankish. Try setting up one of these patterns, included with the package, on an unsuspecting colleague's Mac (but don't do it to somebody who's high-strung).



Kilroy Is Here Kilroy peeps over the active window, looking wanly at the cursor. The window has been torn in half by The Ripper, another goofball program from *Totally Rad Mac Programs*.

the gag. Still, if you think you might enjoy the rabbit habit, grab it.

Stupid Mac Tricks

WHEN THIS SHAREWARE-BOOK COMBO first appeared, it was really something. A disk? Taped inside the back cover of a book? And you can use the stuff on your Mac? Neat!

On the disk are 14 goofy or fun-inducing software trinkets: a demo version of Talking Moose; the SoundMaster control panel (which lets you assign wacky sounds to Mac activities like ejecting a disk or shutting down); EyeCon (a program that puts a floating pair of eyeballs on your screen, whose pupils follow your cursor's movement); and so on. Of the collection, the best prank was the classic Sexplosion, an icon whose name prompts the victim to double-click on the icon, only to get the "Sorry, a System Error has occurred" bomb box, only to find that the Restart button darts skittishly away from the cursor, and thus can't be clicked at all.

This collection by Bob LeVitus, while ground-breaking, is about a century old (measured in computer years, which are like dog years but you multiply by 50 instead of 7). Several of these mirth-making

morsels don't work under System 7. Yo, Addison-Wesley (617/944-3710)—if you are going to keep selling this book (\$19.95), how about updating it?

Son of Stupid Mac Tricks

FAR FROM BEING A PALLID RIP-OFF OF the original book, this later volume is actually superior (same price/author/publisher). The jokes and stunts are less tired; most of them were new even to me, a grizzled shareware junkie. Reagan is Watching is a window featuring a grisly likeness of our ex-president, whose pupils again follow your cursor, and who actually mutters a few Reaganisms now and then. Unfortunately, I could get neither the pupil-rolling nor the comments to work. But it's a hilarious and inexplicable concept.

Eyeballs is much like the EyeCon program in the original *Stupid Mac Tricks*—but this one is a system extension that puts the eyeballs discreetly in your menu bar, so it's less trouble, doesn't cover up your work, and is even more useful for PowerBook users who occasionally need to be shown where the cursor is. These eyeballs are also funnier: they blink, look around, and even close sleepily if your cursor isn't moving. Mouse Odometer, an ingenious system extension, logs the distance your cursor travels each day, in miles. To honor April Fools' Day in style, you could install Subliminal, which occasionally flashes one-second messages on your victim's screen ("Send Pogue chocolate"). Since you can write the messages yourself, Subliminal is a perfect prank that almost certainly won't get you fired.

True, the collection is a little uneven (although less so than the first). But the wit quotient is high; the "hey!" factor is superb; and a blinking, yakking, noisy Mac with all of these tricks loaded simultaneously will wipe that serious look off of any passerby's face.

The Upshot

I TAKE IT BACK. THERE REALLY ARE SOME programmers with a kinder, gentler humor streak. I still think the "your system has crashed" kind of joke isn't so much funny as it is dumb and/or mean. But then there's the guy who writes utterances for the Talking Moose . . . the guy who made 100 minimovies of people telling jokes . . . and the guy who sat up all night long making his \$3000 computer sing "99 Bottles of Beer." These people are not only good programmers, but they possess that elusive, oddball quality that makes their creations so unusual: to wit, wit. **m**

Contributing editor David Pogue's first novel, *Hard Drive*, a \$5 Macintosh techno-thriller, will be published in April 1993 by Berkeley Publishing Group.

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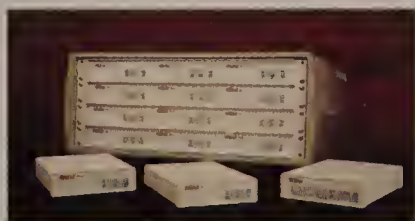
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Network-capable fax modem with software that allows up to 8 fax lines to operate simultaneously; expandable to 12 modems. Software integrates with E-mail systems such as Microsoft Mail and CE Software's QuickMail. Additional fea-



FlexFax with 4Sight

tures include accounting, archiving, inbound/outbound printer support, and multiple cover-page selections. Modem sends and receives data at 2400 bps and sends and receives faxes at 9600 bps. 4Sight Software for fax modem sold separately. 5MB min. memory. \$799; 4Sight for up to 5 users \$749. Circuit Research Corp., 603/880-4000; fax 603/880-8297.

Genie Scan Converter

Scan converter changes computer video signals to TV signals so you can record on-screen presentations with a VCR, or display computer data on large LCD projectors. NTSC version \$1695; multistandard version \$2795. Jovian Logic Corp., 510/651-4823; fax 510/651-1343.

Infinity Optical 3.5" E

A rewritable optical drive that stores 128MB of data on 3.5-inch cartridges. Has data-transfer rate of 768 KBps and average access time of 46.3ms, according to the company. \$1799; internal for Quadra \$1699. PLI, 800/288-8754, 510/657-2211; fax 510/683-9713.



Infinity Optical 3.5" E

LocalTalk Accelerator

Accelerator board for LocalTalk networks increases number of ports available to four and increases data-transmission rate to 920 Kbps, as opposed to standard LocalTalk rate of 230 Kbps, according to company. \$895. Velan, 415/949-9150; fax 415/949-9170.

MK-538FB

High-capacity (1.2GB) hard drive with SCSI-2 controller; has 12ms average seek time and 10MB-per-second data-transfer rate, according to company. \$2395. Toshiba America Information Systems, 714/583-3000; fax 714/583-3133.

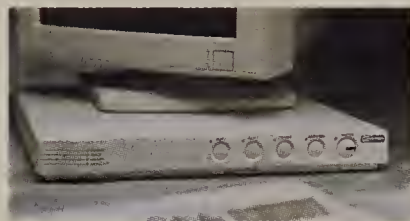
MT1432Mu-Mac

Fax modem transmits and receives data at 14,400 bps or 9600 bps and sends and receives Group III fax transmissions at 9600 bps or 4800 bps. Power from adapter or 9-volt battery, which operates modem for 1.5 hours on line or 6

hours in stand-by mode. Ships with Smith Micro's Quick Link II communications software. 1MB min. memory. \$729. MultiTech Systems, 612/785-3500, 800/328-9717; fax 612/785-9874.

PowerTrax 3000

Surge-suppression device clamps transient voltages at 60 volts above the sine wave, according to the company. Has lifetime full replacement warranty. \$149.95. EFI Electronics, 801/977-9009, 800/877-1174; fax 801/977-0200.



PowerTrax 3000

QMS 1725

Multinetwork printer serves up to 20 users in a mixed-platform environment. Features 600-by-600-dpi resolution, 25MHz, Intel 80960CF RISC-based controller, 8MB of RAM, and 39 PostScript-compatible typefaces. \$5995. QMS, 205/633-4300, 800/631-2692; fax 205/633-4866.

RGB/Videolink 1500AX

Video scan converter converts computer output to video for taping, transmission, or projection; includes built-in linear keyer for overlaying text and graphics on a composite video or S-video background. Provides antialiasing, 24-bit color processing and real-time operation. \$12,995. RGB Spectrum, 510/814-7000; fax 510/814-7026.

RIPServer

System runs software raster image processors (RIPs) up to 100 times faster than a Quadra, according to company. This network peripheral has 8MB of RAM, on-board Ethernet, a 200MB SCSI hard drive, a 1.44MB floppy drive, and three slots; attaches to a Mac that runs the RipManager front end. Requires System 7. \$14,500. Torque Systems, 415/321-1200; fax 415/321-1298.

SCSI-II Dart

External RAM (memory) drive comes with 128MB of RAM and can be upgraded to hold up to 512MB. Uses SCSI-II interface and gives 0.5ms access time to a server, according to company. Built-

in battery maintains information during power fluctuations and outages. \$4700. Newer Technology, 316/685-4904, 800/678-3726; fax 316/685-9368.



SCSI-II Dart

SCSI Monitor Plus

When installed in computer with multiple peripheral devices, this monitor regenerates and conditions internal SCSI bus signals to improve internal and external computer and peripheral performance. \$345. Applied Concepts, 619/453-0090; fax 619/453-6715.

XM-3401 Series

A line of CD ROM drives that have 330 KBps transfer rate and 200ms access time, according to company. XM-3401B internal drive measures 1.63 by 5.76 by 8 inches. TXM-3401E external drive measures 2.7 by 8.7 by 9.8 inches. Subsystem kit for connecting drive to Mac sold separately. XM-3401B \$695; TXM-3401E

\$895; subsystem kit \$115. Toshiba America Information Systems, 714/583-3000; fax 714/583-3133.

SOFTWARE

2Way Network Speaker Phone

Allows two users on a Mac EtherTalk or LocalTalk network to communicate using Mac's microphone and speaker. This software-only product requires System 7. 2MB min. memory. \$79 per station. 2 Way Computing, 619/452-3888; fax 619/452-3077.

Alphabet Blocks

A monkey and a jack-in-the-box guide child through four different games teaching letter sounds, letter names, word sounds, vowel/consonant recognition, and simple vocabulary. Requires SuperDrive and System 7. 4MB min. memory. \$69.95. Sierra On-line, 209/683-4468, 800/326-6654; fax 209/683-4297.

Contact Ease

Version 2 of this sales software has to-do list, word processing module, automatic dialing, call timing, built-in management reports, and scripting for automating sales follow-up. 1MB min. memory. \$395 per user; five-user version \$1495. WestWare, 619/660-0356, 800/869-0871; fax 619/660-0233.

Data-Areas

Information manager maintains information about an individual's daily

events, business or personal contacts, schedules and appointments, daily activities, notes and memos, and world time. 2MB min. memory. \$59. numa Technology, 203/256-1973, 800/274-5221; fax 203/254-2590.



Data-Areas

The Deal

Collection of ten utilities allows users to enter date, time, or any other text with a keystroke; automatically switch screen depths to suit each application; switch mouse speed to suit task and application; change clock for daylight savings time; make any character in any font show up in a pop-up menu; and have a pop-up menu for putting PowerBook to sleep. 2MB min. memory. \$30. PaperClip Products, 918/749-7417, 800/497-5508; fax 918/749-7417, 800/497-5508.

Diskfit Direct

Backup program that copies contents of hard drive onto a set of floppy disks; Bernoulli or SyQuest cartridge drives; opticals; or flopticals. Subsequent incremental backups copy only files that have changes. 1MB min. memory. \$49.95.

Dantz Development, 510/849-0293; fax 510/849-1708.

FileDuo

Personal backup utility automatically backs up file to any mountable volume when Mac is unattended. Copies original files and can back up modified files only, make generational copies (several versions of a document over a period of time), or perform several different backups according to preset scripts. 1MB min. memory. \$149. ASD Software, 714/624-2594; fax 714/624-9574.

Funny Business

Selection of 15 cartoons monthly in EPS format. Cartoons are classified by more than 40 keywords including computers/technology, office scenes, employee relations, women in business, travel, holidays, and health/fitness. 2MB min. memory. Subscription \$279 per year; individual issue \$49.95; sampler disk \$19.95. Sandhill Arts, 415/854-0717, 800/854-0717; fax 415/854-9739.

Gallery Effects: Texture Art

Collection of effects for artwork has 125 textures in 12 categories: Brick, Fabric, Gravel, Ground, Marble, Metal, Plant, Shingle, Stone, Tile, Wall, and Wood. 2MB min. memory. \$199. Aldus Corp., 619/695-6956; fax 619/695-7902.

HomeWorks, BizWorks, and TravelWorks

Template programs for Microsoft Works 3.0; each program consists of a collec-

**OUR NEW 88MB DRIVE
READS AND WRITES YOUR 44s.**

tion of software templates including word processing, database, and spreadsheet documents; graphics and draw layer examples; editable forms; and clip art. HomeWorks includes templates for home finances, home organization, and financial analysis. BizWorks includes templates for cash-flow analysis, business planning, and legal agreements and forms. TravelWorks has frequent-flyer database and mileage-tracking templates, international phone codes, time-zone calculation, currency conversion, and advanced expense reporting. 2MB min. memory. \$59.95 each. Paradigm Concepts, 619/578-2327, 800/466-3957; fax 619/578-3233.



TravelWorks

Jungle Quest

An educational game in which players need to pick up nine tools, retrieve the treasures of King Solomon, and rescue King Whatshisname, who is being held captive by the evil Grumpies. In order to pick up a tool or move from screen to screen, the player has to solve two math problems. For ages 5 to 12. 1MB min. memory. \$59.95. Nordic Software, 402/488-5086; fax 402/488-2914.

MacDatabus

Business programming language provides support for string manipulation, fixed-point arithmetic, interactive input/output, ISAM (Index Sequential Access Method) file access, and AIAM (Associative Index Access Method) file access. Language requires System 7. 1MB min. memory. \$140 plus \$10 s/h. Keech Computer Software, 705/495-1232; no fax.

MacMainFrame for NetWare SAA

Allows Macs on an AppleTalk network to access host sessions via Novell's NetWare SAA communications server. 2MB min. memory. \$395 per user. Avatar Corp., 508/435-3000, 800/282-3270; fax 508/435-2470.

MacMainFrame for SNA ps

Allows Macs on AppleTalk networks to access host information via an Apple Computer SNA ps Gateway. 2MB min. memory. \$395 per user. Avatar Corp., 508/435-3000, 800/282-3270; fax 508/435-2470.

MacVittles

A program that helps food brokers prepare for and manage food-show participation. Program automates the creation of survey sheets; allows orders to be entered at any time; and prints all reports necessary for retailers, manufacturers, and wholesalers. Includes one week of on-site installation, customization, and training. 4MB min. memory. \$4995. Software Solutions, 812/477-3181; no fax.

MapArt Volume 4: Metro Areas USA

This collection of maps in EPS format for 25 major metropolitan areas in the United States shows coastlines of oceans, lakes, and rivers; major roads; and city landmarks including parks, universities, airports, and stadiums. 4MB min. memory. \$99. MicroMaps Software, 609/397-1611, 800/334-4291; fax 609/397-5724.

Millie's Math House

Six math activities teach children how to count, solve problems, and recognize sizes and shapes. For ages 2 to 6. 2MB min. memory. \$49.95. Edmark, 206/556-8484; fax 206/861-8998.

Peanuts Interactive Comic Book

Interactive games and exercises that help children improve their mathematics, geography, reading, and computer skills; five separate activities, with varying levels of difficulty. For ages 4 to 12. Also available on CD ROM. 5MB



Peanuts Interactive Comic Book

min. memory. \$64.95. Image Smith, 310/325-1429, 800/876-6679; fax 310/539-9784.

PICTPorter XTND Interface

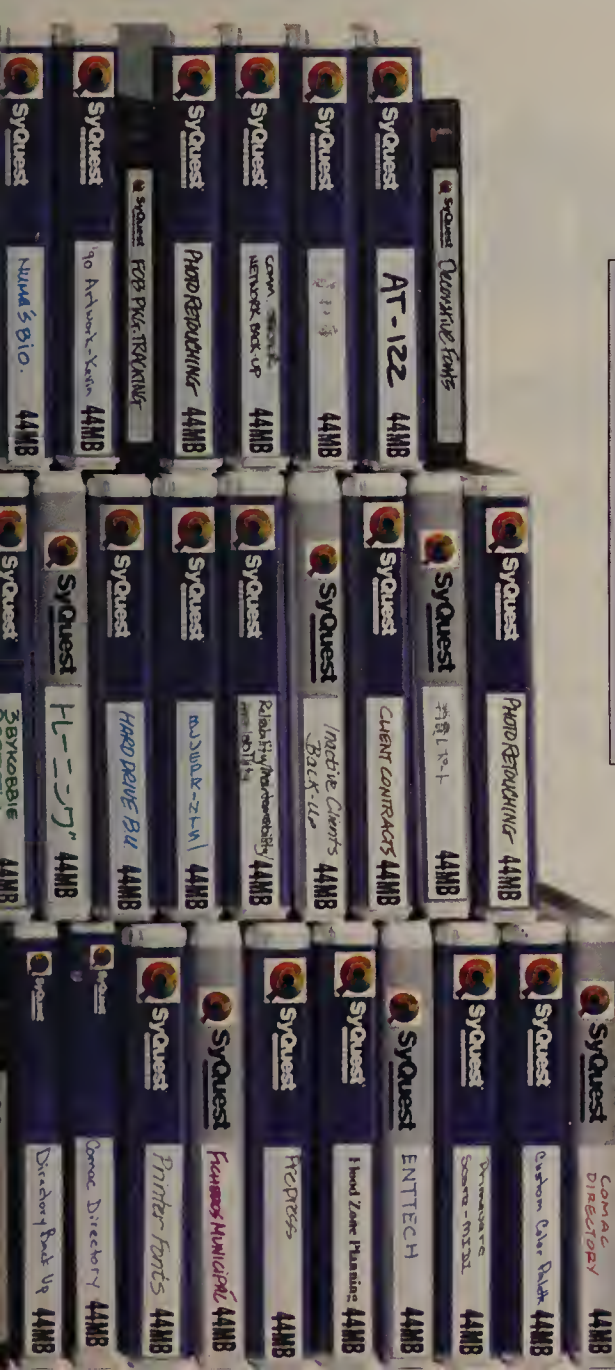
Converts graphics files directly from within any application that includes the Claris XTND system, such as MacWrite II, MacPaint 2.0, and MacDraw Professional. Includes PICTPorter translation driver; control panel device for changing options; and drop-in translators for CompuServe GIF, Amiga IFF, PCX, Silicon Graphics RGB, TIFF, Sun Raster, and more. 1MB min. memory. \$99. FGM Softworks, 703/478-9881, 800/783-7428; fax 703/478-9883.

PMProKit

This collection of add-ons for PageMaker includes a ruler tool that lets user create complex rule forms; a tab text tool that lets user establish tab settings based on the width of text lines; a type distortion tool that expands and condenses type based on point settings; a visual kerning tool; and a pica gauge. 2MB min. memory. \$149. Edco Services, 813/962-7800, 800/523-8973; fax 813/960-2356.

SalesForce Express

Combines contact database, time manager, and "solutions" database with built-in word processor. Contact manager has customizable field names, contact notes, telephone dialer, and keyword search and lookup capabilities. *continues*



MACWORLD

MW
EDITORS'
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"SyquestDrives.

... SyQuest is clearly the best choice [for removable storage] for most users... Widely available from dealers and heavily used by service bureaus, SyQuest drives can be counted on for the long term and are reasonably priced. And with the new generation of SyQuest drives just announced, these strengths should only grow."

—Macworld, November 1992



Over 4 million cartridges sold. Protecting your enormous investment in SyQuest cartridges was the inspiration for our new 88MB drive. It reads and writes to all your 44MB cartridges. So you can move to higher capacity and higher performance and still have complete access to all the hard work you've invested. It's one of a series of products resulting from our on-going development of the 5.25" form factor. With more to come.

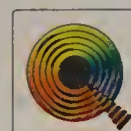


Circle 234 on reader service card

Look for this logo when buying removable storage products.

Syquest Technology, 47071 Bayside Parkway, Fremont, CA 94538 1-800-245-2278

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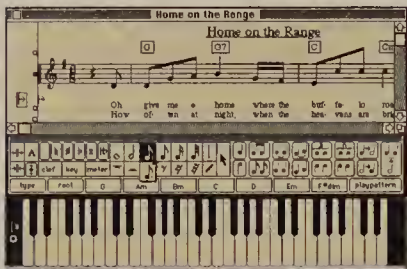
SyQuest
TECHNOLOGY

Removing The Limits Without Compromise.

ties. Solution manager maintains listings for products or services. Time manager allows user to schedule meetings and appointments electronically. Word processor supports multiple fonts, wrap-around graphics, and a spelling checker. 1MB min. memory. \$395. Global Business Acceleration, 404/518-1014; fax 404/365-9861.

Songworks

Notates a melody played on the computer's letter keys or on an external MIDI keyboard, suggests chords to go with a melody, invents melody and harmony ideas for user, and transposes, plays, and prints songs with user's lyrics. 1MB min. memory. \$125. Ars Nova Software, 206/889-0927, 800/445-4866; fax 206/889-0359.



Songworks

TabHouse

Cross-tabulations program tabulates with unweighted as well as weighted data and can include up to 32,000 banner columns, flexibly defined by raw single variables, categorized single variables, and two- or three-level combinations of these

(for example, tabbing all variables by gender within defined age categories within a city). User can specify tables by dragging and dropping variables and statistics. 1MB min. memory. \$695. Pericles Software, 419/872-0966; fax 419/872-0966.

TrashGuard

This file-shredding utility deletes files by erasing the contents and replacing them with a series of 1's and 0's either once or the three times required to meet Department of Defense standards. The user can set a delay and shred several files at once. The user can create exceptions, so that confidential files are shredded and nonconfidential files are erased normally. 1MB min. memory. \$79. ASD Software, 714/624-2594; fax 714/624-9574.

Turbo Math Facts 2.0

In this educational game, players solve math problems to earn money with which to buy cars and trucks to race against Turbo Tom. For ages 5 to 12. 1MB min. memory. \$49.95. Nordic Software, 402/488-5086; fax 402/488-2914.

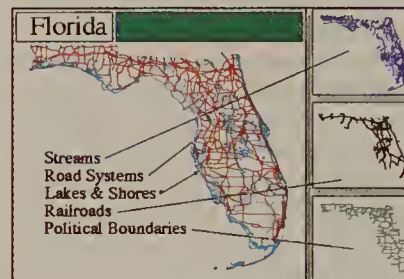
UTF Home Business Pack

A collection of picture and ornament TrueType fonts with more than 800 characters including check marks, fists, bullets, brackets, and dingbats. Package includes keyboard charts and installation instructions. 1MB min. memory. \$59.95. U-Design Type Foundry, 203/278-3648, 800/945-3648; fax 203/278-3003.

CD ROMS

Azimuth US Geodata

Azimuth-compatible CD ROM of detailed United States geographic data allows the user to add national forests and wilderness areas, national wildlife refuges, Indian reservations and military reservations; county, incorporated city, village, town, borough, and hamlet boundaries; lakes, reservoirs, glaciers, marshes, and swamps; alkali flats, islands, shorelines, rivers, streams, canals, and intercoastal waterways; interstate highways; railroads; the continental divide; and the Alaska pipeline to Azimuth maps. 2MB min. memory. \$495. Graphsoft, 410/461-9488; fax 410/461-9345.



Azimuth US Geodata

L-Zone

Interactive multimedia game set in a science fiction theme park. In a deserted dome city of the future, the player goes through tunnels and has to manipulate various machines to further the game. Includes QuickTime clips, MIDI audio, and 3-D images. 5MB min. memory.

\$99. Cameo Interactive, 213/848-8436, 800/833-8339; fax 213/848-3034.

Material World I and II

Collections of clip art for backgrounds and textures; allows user to browse art, find materials by file name, preview textures on screen, and view materials by category. Material World I has 200 items featuring stone, glass, and metal textures, as well as a tool that gives user the ability to create 3-D buttons, balls, and embossed letters. Material World II has 260 items including wood, paper, and fabric textures. 5MB min. memory. \$99 each. Cameo Interactive, 213/848-8436, 800/833-8339; fax 213/848-3034.

Murmurs of Earth:

The Voyager Interstellar Record

Re-creation of the golden record sent into space in 1977 on the Voyager spacecraft to give possible inhabitants of other planets a glimpse of our world and ourselves. Includes full-color photographs taken by the Voyager spacecraft on their missions and an essay written by Carl Sagan and Ann Druyan. Two CD ROM set. 4MB min. memory. \$59.99. Warner New Media, 818/955-9999, 800/593-6334; fax 818/955-6499.

Reflexion I and II

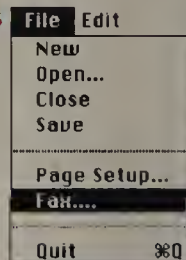
Two interactive adventures combine 3-D art with MIDI music and QuickTime movies. Reflexion I has three parts: Shangri-La, Robot Works, and Robot Words. In Reflexion II, a hospital waiting room leads to a dungeon of Quick-

Remote, 14.4K bps, laptop to desktop.

POWERPORT/GOLD INTERNAL FAX/MODEM



PowerPort/Gold™, the first 14.4K bps internal fax/modem* for the PowerBook™, is the product of choice for mobile computing. PowerPort/Gold supports the fastest data communication standards available – optimal for AppleTalk® Remote Access. Using ARA, you can check your E-Mail, access a file server, or files on your desktop computer just as if you were at the office. And our acclaimed GlobalFax™ software, bundled with every product, makes faxing as easy as printing a document.



THE POWERPORT SERIES

POWERPORT/BRONZE	2400 BPS
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* PowerPort/Gold fax transmission and reception at 9600 bps.

Time monsters. 5MB min. memory. \$99 each. Cameo Interactive, 213/848-8436, 800/833-8339; fax 213/848-3034.

Word Tales

An educational program in which a child must choose the first letter of simple words to identify an object. A character pronounces each word the child creates until the child selects the correct first letter. Children are rewarded with arcade games after correctly spelling several words. For ages four to seven. Available on floppy disks. 4MB min. memory. \$59.99; five-disk set \$49.99. Warner New Media, 818/955-9999, 800/593-6334; fax 818/955-6499.

ACCESSORIES

Disk Storage

Finished oak boxes hold up to 200 disks in 12 sections, which hold 18 to 20 disks each. Desktop box has lid, clasp, and felt-covered bottom. Traveler box has lid, lockable clasp, carry handle, and rubber feet on its hinged edge. Tray is designed to sit in a desk drawer; tray has felt-covered bottom. Tray \$40; box \$60; Traveler \$70. Wagman Woodworks, 914/338-7537; no fax.

FlipNotes

An erasable keyboard reference template for users of macro-editing software such as QuicKeys. Enables users to record and reference defined keyboard commands on five spiral-bound panels. Clear plas-

tic base plate fits above the F-keys on Mac extended keyboards. Marker, eraser, and Velcro fasteners included. \$29.95. Multicomp, 915/676-0844, 800/541-4351; fax 915/675-5944.

LabelOnce

Rewritable Mylar disk labels can be written on and erased indefinitely with any brand of permanent marker and vinyl eraser or alcohol. Starter kit includes labels, marker, and eraser. Starter kit \$12.95. Multicomp, 915/676-0844, 800/541-4351; fax 915/675-5944.

MouseTopper

Device replaces the top cover of Apple mouse with a curved top that has a larger button and wider base. \$19.99. Contour Designs, 415/941-1000; fax 415/941-1474.

PowerBook Monitor Stand

Stand supports 13-, 16-, or 19-inch monitor while PowerBook fits beneath. Open section in back allows user to connect PowerBook to monitor and other peripherals. \$99.95. F&B Enterprises, 716/248-8265; fax 716/381-7159.



PowerBook Monitor Stand

WordySturdy

Copy holder attaches to computer and is capable of holding software manuals, reports and full-size books, as well as single documents. Product mounts on left or right side. \$39.95. Products That Work, 801/221-9212, 800/443-7792; fax 801/221-0225.

BOOKS

Backbone Applications Guide

Tutorial focuses on connecting local area networks into an enterprise-wide backbone network; features sample applications. Chapters cover such topics as statistical and time-division multiplexing, fiber-distributed data-interface backbones, and router-based backbones. Also explains ATM technology and how it can be applied to enterprise networks. 73 pages. Free. Fibermux, 818/709-6000, ext. 500, 800/800-4624, ext. 500; fax 818/709-1556.

Bob Brant's Best of Macintosh Shareware

Describes more than 200 shareware programs, how and where to find them, and how to use them; programs covered include business and productivity software, educational software, multimedia applications, communications software, graphics software tools, HyperCard stacks, utility programs, and games. Comes with a disk containing more than 20 shareware programs. 384 pages. Written by Bob Brant. \$29.95.

Windcrest/McGraw-Hill, 717/794-2191, 800/822-8158; fax 717/794-2080.

Hayden's QuickTime Handbook

Introduces QuickTime and how it works. Teaches how to edit, produce, and display QuickTime movies using popular QuickTime tools including Adobe Premiere and DiVA VideoShop, animation software, 3-D modeling programs, and spreadsheets. Written by David Drucker. \$34.95. Hayden, 317/573-2500, 800/428-5331; fax 317/573-2583.

Programming with 4th Dimension

Two volumes demonstrate the use of a commercial business program written with ACI US's 4th Dimension and include a review of many common programming concepts and practices. A compiled demo version of the program is included on disk. Volume I, 316 pages; Volume II, 634 pages. Written by Mark Yelich. 2MB min. memory. \$54.95 plus \$4.95 s/h. Blackledge Publishing, 507/452-0023, 800/424-4855; fax 507/452-0037. **m**

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. *Macworld* reserves the right to edit all product announcements.

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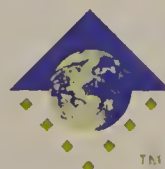
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Now, when you need to access your office, Global Village provides the complete solution. Introducing TelePort/Gold™, our new 14.4K bps desktop fax/modem. Together, TelePort/Gold and PowerPort/Gold ensure 14.4K bps access speeds and complete compatibility. And since both PowerPort and TelePort fax/modems use our GlobalFax software, you'll spend less time learning new applications and more time doing business. For more information or for a reseller near you, please call 1-800-736-4821.

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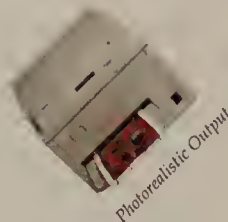
Circle 66 on reader service card



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WHY PEOPLE WHO MAKE A LIVING WITH COLOR, MAKE IT WITH RASTEROPS.



"WE USE RASTEROPS PRODUCTS AT EVERY STAGE OF OUR DESIGN, FROM THEIR 21" MONITORS TO THEIR CORRECTPRINT 300 PRINTER, BECAUSE SPEED AND COLOR ARE CRITICAL IN WHAT WE DO. WE CREATE FULL-COLOR ANIMATED SERIES AND COMMERCIALS FOR TELEVISION, AND NOW TURN OUT THREE TIMES AS MUCH DESIGN WORK AS WE DID BEFORE WE LEARNED ABOUT RASTEROPS."

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COMPUTER ILLUSTRATOR/
ART DIRECTOR
COLOSSAL PICTURES
SAN FRANCISCO

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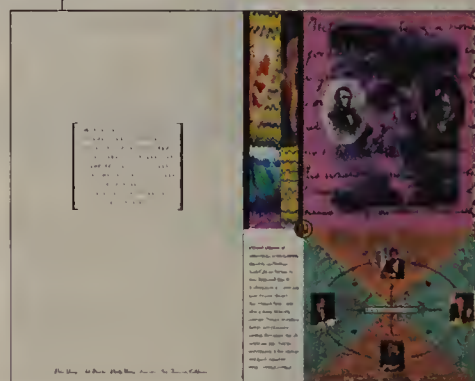
So when your reputation's on the line, specify the line of displays, display adapters, calibrators and printers from RasterOps. We don't just give you color you can live with, we give you color you can make a living with.

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"RASTEROPS' TECHNICAL SUPPORT HAS BEEN GREAT. WHEN I NEEDED TO INSTALL MORE RAM ON MY 21" MONITOR AND 24XLI BOARD FOR SOME DETAILED BROCHURE DESIGN WORK, THEIR CUSTOMER SERVICE PEOPLE TALKED ME THROUGH IT STEP BY STEP RIGHT OVER THE PHONE. I WAS UP AND



RUNNING AGAIN SO FAST THAT I DIDN'T MISS A SINGLE DEADLINE."

SHERRI TAKAHARA
PROJECT COORDINATOR
JACOBS FULTON DESIGN
PALO ALTO

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Questions and Tips from Macworld Readers

BY LON POOLE

A S I EXPLAINED IN LAST DECEMBER'S *Quick Tips*, the stack and heap are two parts of the memory partition that the system software allocates to a program you've just opened. However, contrary to my advice for avoiding the system error "Stack collision with heap," increasing the memory size in an application's Get Info window won't help.

While boosting a program's memory size does increase the heap, it has no effect on the stack size. That's because, when you open an application, the system software allocates a standard minimum stack size for the Mac you're using. The size differs on different Mac models; for example, the standard stack size on a Mac SE is 8K; on a IIx it is 24K. So an application that needs a 10K stack works fine on a high-end Mac, but not on an SE.

Fred Huxham of Apple says such collision problems can be rectified only by the application's developer, who must add program instructions that increase the size of the stack allocated to that application, as detailed in *New Inside Macintosh: Memory* (Addison-Wesley, 1992). Unless software developers test their programs on a wide range of machines, warns Huxham, they can easily (but unforgivably) miss these stack-into-heap bugs.

Upgrade Quandary

Q. I have a IIx with 5MB of RAM, 8-bit video, and a VideoSpigot board—which I use mostly to create hi-res Photoshop illustrations (3MB to 15MB each) and QuickTime movies.

I have thought about upgrading with either 17MB of RAM, a 24-bit graphics board, or a 33MHz DayStar PowerCache. Considering the work I do, which would be the best choice?

I'm also considering a 68882 math coprocessor chip for 3-D rendering; would the speed of the 68882 affect the rendering time? Should I get a 20MHz 68882 (to match the 68030 main processor in my 20MHz IIx) or get a faster one?

One more question: Is there any way

I can install a restart button (programmer's switch) on my Mac? I am getting annoyed at having to switch my computer on and off to restart it when it bombs!

Jeffrey Gugick
Liverpool, New York

A. Your best bet is to increase your IIx's RAM. Additional RAM will improve Adobe Photoshop's performance when editing large images. To realize this speed gain, you must increase Photoshop's memory size (using the Finder's Get Info command) after installing more RAM. Do the same to Adobe Premiere, which probably came with your VideoSpigot board, and you will speed up movie editing and viewing of movie previews. You can also set aside part of your increased RAM as a RAM disk, which functions like a very fast hard drive.

Installing an accelerator would be a better choice than more RAM only if you mostly edit small Photoshop images (3MB or less). But it would mean giving up your VideoSpigot, because your IIx has only one expansion slot. Forget 24-bit video. Some people must have it, but if you were one of them you would never have installed a VideoSpigot. Performance bottlenecks are probably more of a burden to you than the annoyance of viewing 24-bit images (millions of colors) in 8-bit video (256 colors).

If you decide to add a numeric coprocessor, get a 20MHz 68882. The computer's main processor and numeric processor must match the computer's internal instruction cycle clock, which is 20MHz on a IIx. A faster-rated 68882 will not work any faster, and may not work at all.

The IIx has no programmer's switch, but you can restart after a crash by pressing ⌘-control-power on. Similarly, ⌘-power on simulates pressing the interrupt button of a programmer's switch on other Mac models. After pressing ⌘-power on, you'll see a

dialog box with a prompt character in the shape of a greater-than symbol (>). After a system crash, you can sometimes return to the Finder by typing G FINDER and pressing the return key; then use the Finder's Restart command to effect an orderly system restart. These same key combinations work on an LC, LC II, and a Classic II. Note: You must hold down a key combination at least one second to allow the ADB controller chip inside the computer to respond.

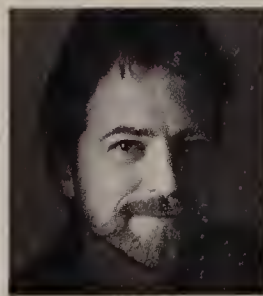
Handy Discovery

Q. What the heck goes on when you hit the shift key five times in a row? Few people probably ever do that, and so never notice the little sequence of icons that jumps up at the right end of the menu bar. In System 7, a bizarre sound goes with the icon sequence, as I discovered when my cat rolled over my keyboard. Why does the inkwell icon fill up?

E. Garry Hill
Mountain View, California

A. You have discovered Sticky Keys, one of the Easy Access control panel's three alternative methods of using the keyboard. With Sticky Keys you can type combination keystrokes such as ⌘-shift-3 (which puts a snapshot of your screen in a file format most graphics programs can open) one key at a time. You can also lock down any modifier key (shift, option, ⌘, or control) by pressing it twice. You turn on Sticky Keys by pressing shift five times without moving the mouse, or by using the Easy Access control panel. When Sticky Keys is on, an icon at the right end of the menu bar shows its status (see "Sticky Keys Status"). Pressing shift five times again, or pressing any two modifier keys simultaneously, turns it off.

Mouse Keys, also part of Easy Access, lets you click, *continues*



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drag, and move the pointer with the numeric keypad. To turn on Mouse Keys, press ⌘-clear; to turn it off, press clear. With Mouse Keys on, the eight keys around the 5 key move the pointer left, right, up, down, and diagonally. The 5 key on the keypad acts like a mouse button. Press it once to click; twice to double-click; or hold it down and press one of the keys around the 5 key to drag. Pressing the 0 key on the keypad locks down the mouse button until you press the period key (.) on the keypad. Mouse Keys is very handy for precisely moving graphic objects.

Slow Keys, the third keyboard modification provided by Easy Access, filters out accidental keystrokes by forcing you to type more deliberately. You have to hold down keys for several seconds in order for your typing to appear on the screen (the actual time depends on the setting in the Easy Access control panel, which ranges from long to short).

Improved Gray-Scale Printing

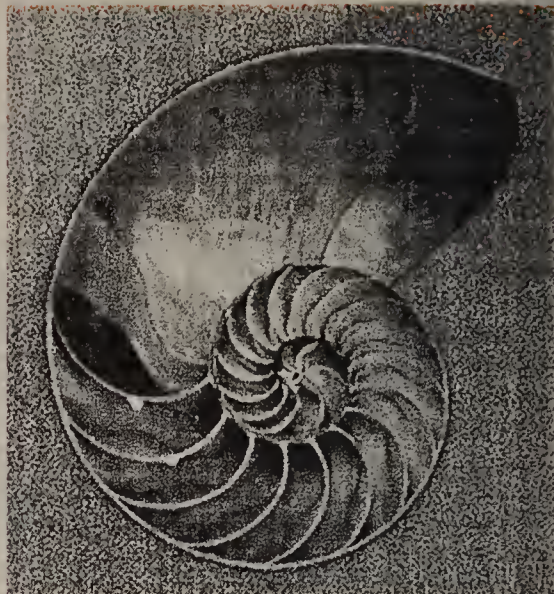
TIP Can't get a decent print of a scanned image on a LaserWriter lacking Photograde, Apple's image-enhancement technology? At 300 dots per inch, the printer's halftone screen obliterates most of your image's detail. You can use Adobe Photoshop to improve image detail and realism and to shorten printing time (see "Bitmapped Photo Grays").

Start by scanning your image at 300 pixels per inch and 256 gray levels. These settings produce a large file and probably slow the performance of your computer, but don't worry about it. You'll soon reduce the file size.

Open the scanned image in Photoshop. If you scanned a printed photograph (from a magazine or another source), apply Photoshop's Despeckle filter to blend the dots introduced in the image by the magazine printer's halftone screen.

Convert the gray-scale image to a 300-ppi bitmap by choosing Bitmap from Photoshop's Mode menu and selecting the Diffusion Dither option in the Gray Scale to Bitmap dialog box. This conversion greatly reduces the image's file size.

Turning a gray-scale image into a bitmap may darken it, so make a test print of the bitmap. If it's too dark, revert to the saved gray-scale and, before converting to



Bitmapped Photo Grays Because of the standard halftone screen it uses for gray-scale printing, a LaserWriter produces coarse, fuzzy output (top). Converting the gray-scale image to a 300-dpi bitmap with Photoshop yields more detail, more realism, a smaller file size, and faster printing (bottom).

bitmap, adjust brightness and contrast levels to lighten the image.

Mark C. Simpson
Bryan, Texas

Instead of adjusting brightness and contrast (using the Brightness/Contrast command in the Adjust submenu of Photoshop's Image menu), try adjusting the gamma using the Levels command as described in the tutorial manual that comes with Photoshop. I got good results with a gamma of 2.2.—L.P.

A Few More Lines

TIP To squeeze a little more onto a letter-size page without reducing text size, shrinking graphics, changing spacing, or otherwise modifying the content of your document, try changing the paper size to US Legal with the Page Setup command before printing on letter-size paper. With this action, my 8½-by-11-inch flier printed perfectly on my HP DeskWriter without any

continues



Sticky Keys Status When Sticky Keys is on, an icon at the right end of the menu bar tells you one of three things: that you have not pressed a modifier key (left), you have pressed one or more modifier keys (middle), or you have locked down a modifier key by pressing it twice (right).



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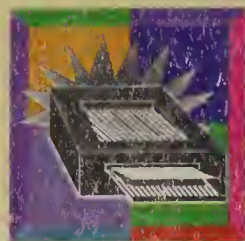
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Dingbat Patterns

You can make great patterns by layering rows of Zapf Dingbat characters with any page-layout or draw program that lets you specify text color, shade, kerning, and leading. Jay Babina of Branford, Connecticut, suggests you use filled graphic shapes (lines, rectangles, and so on) for background layers, and white borderless shapes to mask out parts of the pattern as desired. For a ghost image over an entire page, specify light shades for all layers. Set all items you place on top of the pattern to have no background fill and no text runaround (text wrap). Laser printers and imagesetters spit out Zapf patterns in no time, unlike complicated patterns made with draw programs such as Adobe Illustrator and Aldus Free-Hand, which may choke a printer no matter how much RAM it has.



sacrifice to content, look, feel, impact, or formatting, and had the look I wanted and really needed.

*Greg Suddick
San Luis Obispo, California*

For multiple-page documents, set the bottom margin to three inches or more. This keeps the printer from attempting to print past the bottom of the letter-size paper. This trick doesn't work for multiple-page documents on a StyleWriter (unless you're willing to print one page at a time), because an error message about the too-short paper appears after the first page prints and you can't continue printing without inserting the right size paper.—L.P.

What's Your Time?

TIP When I joined the marketing group of a multinational company that has sales offices and salespeople scattered all over the world, I had to become accustomed to dealing with more than three time zones. I found a way to use the Map control panel to keep track of local times for various people and offices without having to remember the names of their cities. Here's what you do:

1. Open the Map control panel (in System 6, open the Control Panel desk accessory and select the Map icon in it).
 2. Have Map locate the person's city by typing the name of the city and pressing the Find button.
 3. Type the person's name over the city name and click the Add City button.
- Now you need only type a person's

name in Map and click the Find button to see if it's a polite time to call.

*Nitin Apte
Columbus, Ohio*

If you want Map to remember a person whose city isn't on the map, you can either substitute a known city in the same time zone or add the new city. To add a city, click its location on the map or type its latitude and longitude in the spaces provided. Then type the name and click the Add City button.

Whenever you add a new place or person to Map, verify the time zone and correct it if necessary. Map estimates the time zone of a new place based on its latitude and longitude, but time zone boundaries have many irregularities. Also, Map does not know about daylight saving time. If you are on daylight saving time and someone else is not (or vice versa), Map will be off by one hour in computing the other person's local time.

If you haven't already set your Mac's location, the base location, do that by finding or adding your city and then clicking the Set button. Map marks the spot with a flashing dark cross and changes the time and date of your system clock according to the difference between the former base location and the new base location.

To enlarge the map, press the option key while opening the Map control panel. To magnify more, press shift-option while opening.—L.P.

Gradient Fill for Text

TIP Filling text with an ordinary pattern is well documented in Canvas 3.0, but not filling text with a

continues

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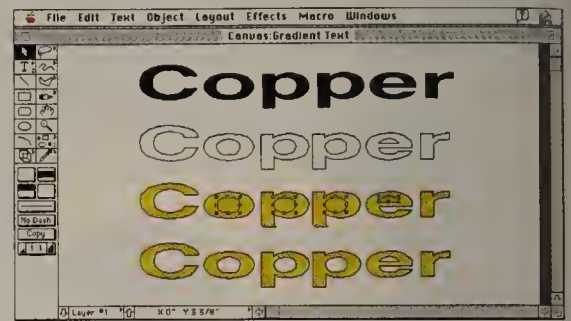


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Don't Copy That Floppy



Graded Text To get the dynamic effect of text filled with a gradient in Canvas 3.0, convert the text to Bézier curves, set their fill pattern to white, and apply one of Canvas's gradient fills.

gradient (see "Graded Text"). I discovered a simple method that works amazingly well:

1. Select a text block with the pointer tool (not the text tool) and choose Hollow from the Text menu's Create Béziars submenu to convert the text to Bézier curves and select them as a group.

2. With the Bézier curves selected, choose the white fill pattern (second row from the top, leftmost column in the fill pattern palette).

3. With the Bézier curves still selected, choose a gradient pattern from the Gradient submenu of the Object menu. If the gradient pattern does not automatically set a center point, you must click to select one. This point can be anywhere in the document window, so experiment to achieve different effects.

4. If the Bézier text includes letters with centers that should be unfilled, such as *o* and *p*, choose Ungroup twice in succession from the Object menu. Then click anywhere in an unused area of the drawing window to deselect the Bézier curves, and shift-click the centers that should be unfilled. With the centers selected, choose the None pattern from the Gradient submenu of the Objects menu.

To apply a different fill to each letter, choose Ungroup from the Object menu after completing step 2. Now apply steps 3 and 4 to each letter individually.

Robert Paul Wiseman
Ellicott City, Maryland

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LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld Guide to System 7.1* (IDG Books Worldwide, 1992).



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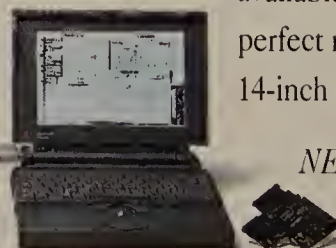
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Mail Merge

BY JIM HEID

DEAR «NAME»: IF YOU ARE like many «job title>s, you have compiled a database of customers who use your «product.» Now and then, you want to notify your customers of a «sale/special offer.» Or perhaps you want to inform them that their accounts are «paid up/past due.» In any case, you want your letters to be personally addressed—none of that *Dear valued customer* stuff.

You're a candidate for *mail merge*.

Mail merge is the science behind all those publishers' sweepstakes mailings, magazine subscription offers, and check-up reminders from your dentist. Mail merge, also called *print merge*, is the process of combining, or merging, a data file with a text document. Usually created in a word processor, a text document contains the letter's boilerplate text—the stuff that doesn't change from one recipient to the next. The data file contains the names, addresses, account information, and so on. You create the data file by extracting data from a database or spreadsheet program or by typing it directly into a word processor. You then merge the data file with the boilerplate text to create that oxymoronic marvel of the computer age: the personalized form letter.

The Macintosh world's most popular word processors have mail merge features that go beyond simple form letters. Microsoft Word 5.1, MacWrite II (Claris), and WriteNow 3.0 (T/Maker) allow *conditional merges*—if *x* is true, then insert text *y*; otherwise insert text *z*. If an account is paid up, thank the recipient; if not, remind the deadbeat to mail that check. Word, WordPerfect 2.1, and WriteNow let you type in text during the merge, so you can add personal comments to letters. You can also use this capability to prepare other types of documents, such as legal contracts—store all the boilerplate contract text in one document, and then type the information specific to a particular contract during the merge.

Mail merge is one of those word processor features that gets dusty from disuse. True, many people don't need to send personalized form letters. But another reason may be that the merging process

isn't as easy as point-and-click. Merging data with canned text usually means walking the dark alleys of data *export* and *import*—transferring information out of a database (or spreadsheet) program and into a word processor. Mail merge also requires some advance setup time and troubleshooting, lest you get weird results like “Dear Mr. 123 Main Street.”

This month I give step-by-step instructions for using the mail merge features in Word, WordPerfect, and WriteNow. For a database program, I'll use Claris's popular FileMaker Pro 2.0. See “Easier Merging” for an introduction to the mail merge features in two popular integrated programs, ClarisWorks and Microsoft Works. Their mail merge features aren't as sophisticated as those of the word processors, but they're easier to use because you don't have to move data from one program to another.

Prepare to Merge

A MAIL MERGE PROJECT GENERALLY requires three components (see “Mail Merge Illustrated”):

- A data file containing the information to be inserted in each letter. The data is arranged in typical database fashion: a collection of *fields* (the name, address, city, state, zip code, and so forth) and *records* (all the fields for one entry—for example, one person's name and address).

- A word processor document with the boilerplate text, including field-name codes that show where the information from the data document is supposed to go. In Word, this is called the *main document*. In WriteNow, it's the *template document*, and in WordPerfect, it's the *primary file*. (I use the term *template document* here, since it reflects the fact that the document is a template for each custom form letter.)

- A word processor document into which you import the data file. In Word and WriteNow, this is called the *data document*. In WordPerfect, it's called the *secondary file* or the *address file*. (I use the term *data document*, since it's more descriptive.)

After you assemble these three pieces, you tell your word processor to begin merging. The word processor then creates a new, untitled document—the *merge document*—containing the boilerplate text as well as the data from each record of the data document, with page breaks separating each form letter.

There are several variations to these basic steps. You can instruct your program to discard the merge document after it's printed, or you can choose to save it. You can work without a data document, typing in all your information from the keyboard as each new letter appears instead. As I mentioned earlier, you can dispense with a database or spreadsheet program entirely by creating the data document within your word processor; Word's table feature comes in handy for this. In WordPerfect, you can run a macro (an autopilot-like series of commands) during the merge. I'll look at some of these merge variations shortly.

Exporting the Data

BEFORE YOU START UP A WORD PROCESSOR, you need to export your data, creating a text-only file that you will then import into the word processor to create the data document. This export-import routine is one of mail merge's tallest hurdles—it's the reason many people resort to the *Dear valued customer* approach.

Exporting and importing is necessary because a word processor can't directly read the files created by a database or spreadsheet program—they are different types of tools. You can't use a word processor to open a FileMaker Pro database any more than you can use a can opener to open a bottle of wine.

For your word processor to be able to distinguish one data field from another and one record from the next, fields and records must be separated by special characters called *delimiters*. The most common delimiting scheme involves separating each field by a tab character and each record by a carriage return. A

continues



*You, too, can
send customized
form letters—
Ed McMahon's
mail merge
secrets exposed*

file organized this way is often called a *tab-delimited text file*. Another scheme involves separating fields with commas instead of tabs and enclosing each field item within quotation marks ("")—the *comma-delimited* format. Microsoft Word and WriteNow work with either format. WordPerfect requires data documents to be in a special format I'll describe later.

There's another important piece of information a word processor needs before it can accomplish a successful merge: a line at the top of the data file that contains the name of each data field being used. This line is generally called a *header record*. If you're using FileMaker Pro to create your data file, simply save it in the program's *merge format*. It's identical to the comma-delimited format, with one exception: it automatically inserts a header record into the data file. If you use a database or spreadsheet program that can create only standard comma- or tab-delimited text files rather than merge-format files you'll have to type the header record yourself after you've imported the data file into your word processor.

How to: FileMaker Pro With any version of FileMaker Pro, to create a data file for merging, first be sure to select the records you want to export. (If you previously used the Find command to select only certain records, then only those

records will be exported. To export the entire database, choose Find All from the Select menu.) Next, choose Export from the File menu, type a name for the merge file, and choose Merge from the File Type pop-up menu. Click on New, and up comes a dialog box that lets you choose which fields to export. If there are fields you don't want to export, click on the check mark next to their names. Click on OK when you've finished, and FileMaker Pro exports the database.

The file you just created is your data document—it contains the information that will be inserted into your form letters. Your next job is to prepare the template document—the one that tells your word processor where and how to insert information from the data document. If you used a database or spreadsheet program to create your data file, you can quit it now. From this point on, you'll use only your word processor.

Merging with Microsoft Word

WORD 5.0 AND 5.1 PROVIDE A *PRINT merge helper*, which walks you through the process of choosing a data document and creating the template document.

How to choose a data document: Choose New from the File menu and then choose Print Merge from the File menu. In Word's Print Merge dialog box, select

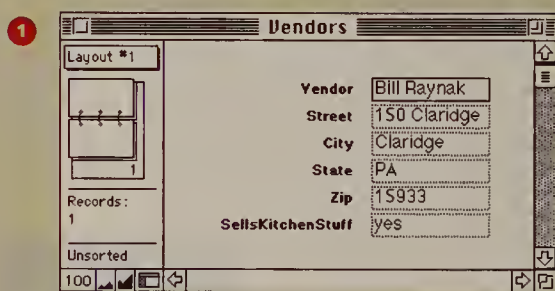
the Merge and Save Results in New File option, and then click on the Show Helper button. A dialog box asks you to select the data document. Locate the data file you previously created and double-click on its name. If a dialog box appears asking you to select the Text or Text With Layout format, choose Text. In a moment you'll see the Print Merge Helper bar (see "Merging with Word"). Below it, a special instruction line called the *data statement*, tells Word which file to use for the data document.

The data statement—and all other merge-related commands that appear in a template document—must be surrounded by the international quotation mark characters, « and ». Word's Print Merge Helper bar inserts these characters automatically as you choose field names and other merge statements. You can also type the characters by hand: press the key-stroke combination option-backslash (\) for the « character and shift-option-backslash for the » character.

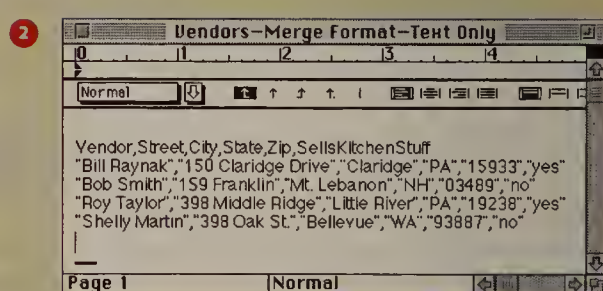
How to create the template document: Type and format the boilerplate text of the form letter. When you want to insert the contents of a certain field, choose its name from the Insert Field Name pop-up menu. Some lines—such as the recipient's address in a business let-

Mail Merge Illustrated

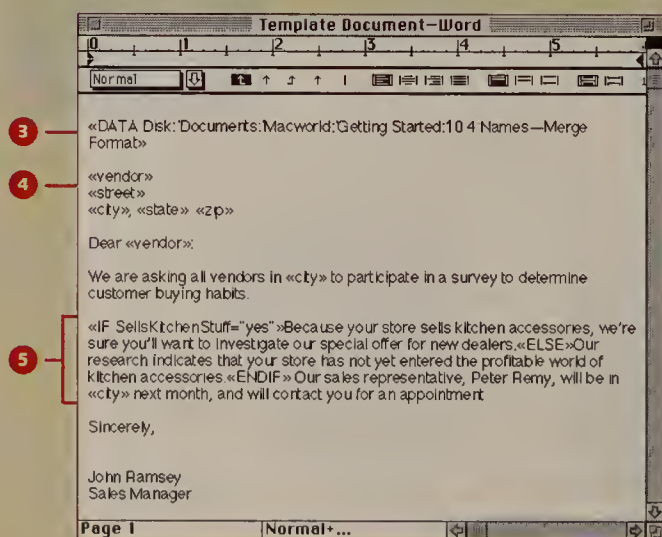
Mail merge begins with a database's fields and records (1). You prepare a data document by exporting the database as a text-only file (2). This example is a comma-delimited file—each field is separated by commas, and each field item is enclosed within quotes. The first line of the data document is a header record that identifies the field names (3). The form letter's contents are determined by the template document, which uses field codes (4) to tell the word processor where to insert information from the data document. Word and WriteNow allow conditional merges (5) that insert text only if a certain field contains a specified value. The data and template documents meet during the merge itself, and the result is a personalized form letter (6).



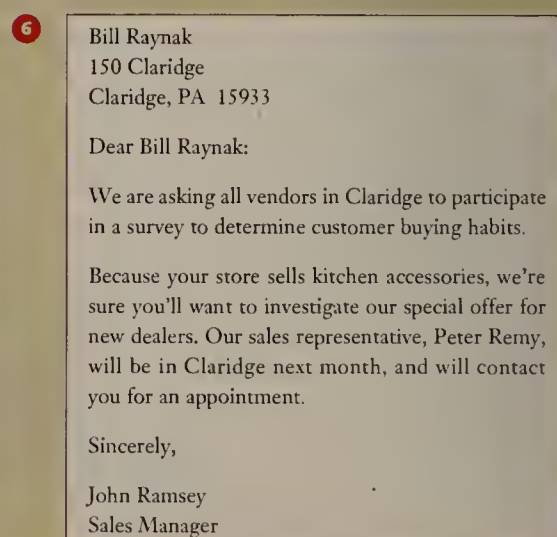
Database



Data document



Template Document



Merge Document

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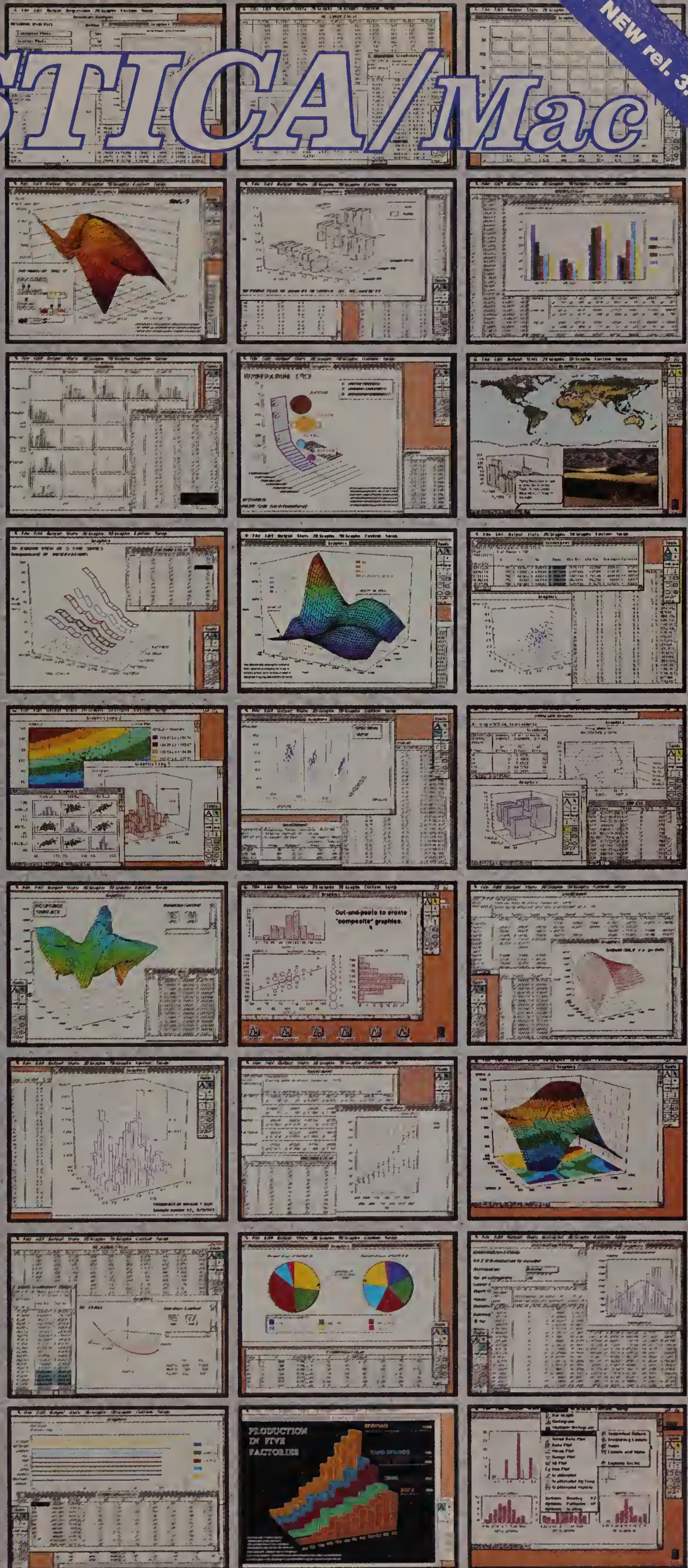
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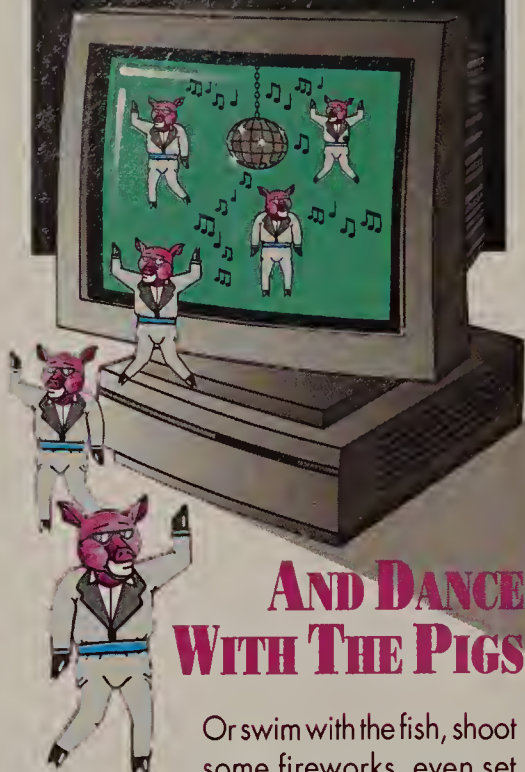
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ter—might contain only field names. If you want a field's contents to appear in a different font, size, or style, highlight the field name and specify the format.

Next to the Insert Field Name pop-up on the Print Merge Helper bar is the Insert Keyword pop-up. This menu enables you to insert *keywords* that tap Word's specialized print-merge features. For example, the IF...ELSE...ENDIF series of keywords lets you create those conditional merges I mentioned earlier. The ASK keyword displays a dialog box that lets you type in some information during the merge. Save the template document when you're finished. (You might want to include the word *template* in its name to remind you of the document's purpose.)

The best way to try out the template document is to click on the second icon from the right on the Print Merge Helper bar. This tells Word to merge the data and template documents and create a new file containing the results. As you look over the resulting merge file, make sure that each piece of data has the right number of word spaces around it—it's easy to wind up with incorrect spacing, especially when you're inserting one field immediately after another or using the IF...ELSE keywords.

Notice that each form letter in the merge file is separated by a section break—which is indicated by two parallel dotted lines when the merge document is displayed in normal view. The section break is what causes each letter to begin on a new page, which you can see by switching to page view.

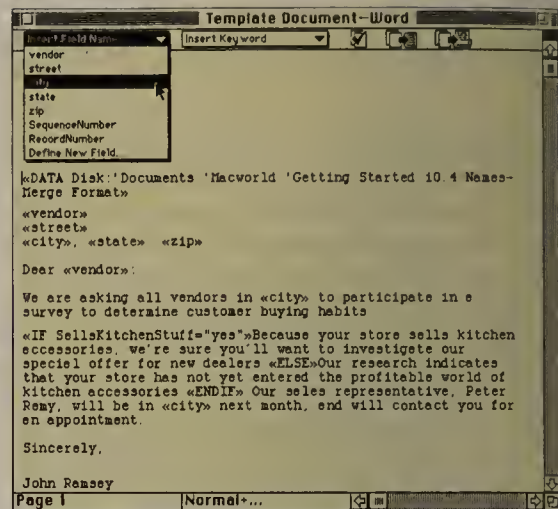
If the form letters look correct, you can print them. You can save the merge document if you anticipate printing the form letters again, but you don't have to save it; you can always generate the merge document again if you save the data and template documents.

Merging with WriteNow

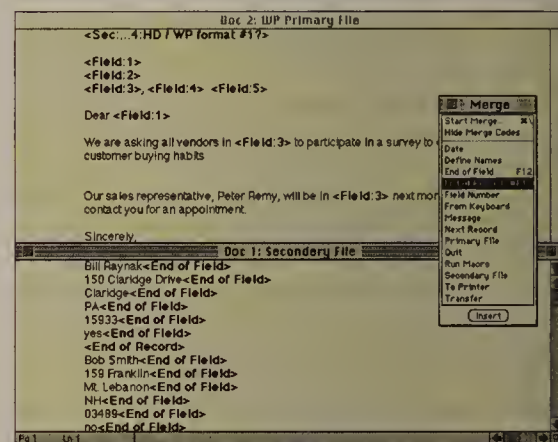
THE BASIC STEPS BEHIND MERGING with WriteNow are very similar. WriteNow uses the same merge characters (« and ») and keywords as Word; you can generally move template and data documents between Word and WriteNow and use them without modification.

There is one big difference: WriteNow doesn't provide a Print Merge Helper, so you must type field names and keywords yourself. See page 244 in the WriteNow 3.0 manual for details.

How to create the merge document: When you've finished creating the template document, save it. To perform the merge, choose Merge from the File menu. In the dialog box that appears, click on the New Document button. (You



Merging with Word The pop-up menus in Word's Print Merge Helper bar simplify adding field names and keywords to a template document. The first line of the document is the DATA statement, which tells Word where to find the data document for this merge project.



WordPerfect Merging WordPerfect's Merge dialog box lets you insert field numbers and the end-of-field and end-of-record codes you see displayed in the bottom window.

could click on the Printer button, but it's better to merge to a new document that you can proofread for errors.)

After you click on New Document (or Printer), a dialog box appears asking if the data document has line breaks inserted. Click on No, and the merge takes place. Like Word, WriteNow formats the merge document so that each form letter begins on a new page.

Merging with WordPerfect

A WORDPERFECT TEMPLATE DOCUMENT, called a *primary file*, looks much like a Word or WriteNow template document, with field codes indicating where information from the data document is to be inserted. The field codes themselves are a bit different; field names, for instance, are enclosed in greater-than and less-than signs (< and >), not the « and » characters (see "WordPerfect Merging"). Also, WordPerfect simply numbers fields instead of requiring you to give them descriptive names.

How to create a primary file: Choose Merge from the Tools menu to display the Merge dialog box, which looks like a *continues*

How Butterflies Transform

The butterfly passes through several stages in its glorious transformation from egg to the completed creature that we all visualize as the butterfly. The adult female lays between one hundred and several thousand eggs throughout her lifetime each with the potential of becoming an adult butterfly itself.

Each egg, so tiny that it can only be seen by the human eye with the help of a microscope, is laid on or near a plant on which the newly hatched grub will be able to feed. These eggs are often green or yellow, but can also be found in shades of blue or red, each with a shell-like design covering it.

Usually in the spring or summer a tiny caterpillar, or grub, will hatch from the egg. This wormlike creature almost immediately begins to feed as it will consume the majority if not all of its nutrients during this phase of its life.

The caterpillar will continue to eat until it has eaten so much that its skin can no longer contain the newly acquired mass. The skin then bursts and the caterpillar will shed it in order to have it replaced by a newer and larger one. This process continues for weeks as the caterpillar increases in size, several times its original mass.

Often during the time of fall, the caterpillar will then either spin a silken pad from which it suspends itself by its hind legs or it will fasten its body upright by silken threads to a twig creating a chrysalis or exposed pupa. Usually after spending the winter months dormant, the final stage of transformation will take place.

The shell of the chrysalis is broken open and the creature that emerges is barely recognizable as the butterfly that it will become. Its wings are crumpled and kept close to its moist limp body. It will remain clinging to the cocoon or a nearby branch as its form gradually begins to become dry and firm.

It moves its wings slowly at first with little strength but as they dry it is soon ready to take flight. The creature that ascends into the air has been through its final stage of development and is now the completed butterfly. This butterfly is now called the *imago*, or perfect insect.

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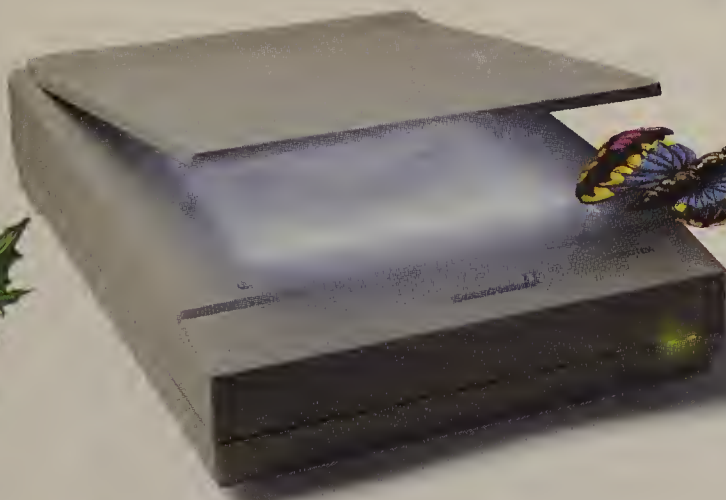
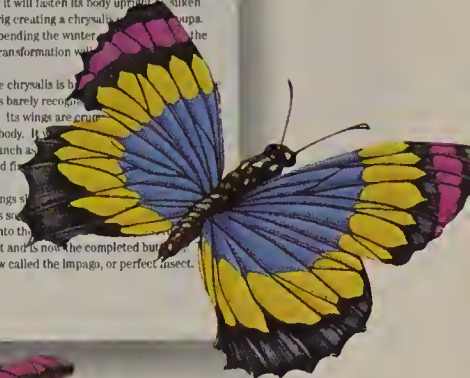


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window. To insert a field code, double-click on the Field Number command in the Merge box. In the Field Number dialog box, specify a number for the field; if you want to be prompted for a field name or number during the merge, choose the Prompt for Field Number option. Save and close the primary file when you've finished.

Where the data document is concerned, WordPerfect breaks from the pack. WordPerfect can't use any of the standard text-only formats—tab-delimited, comma-delimited, or merge. Instead, you need to manually indicate where fields and records end by inserting *end of field* and *end of record* codes. This adds extra work to the merging process. Fortunately, you can use the Find/Change command to automate some of the work.

How to create a secondary file: When exporting a database, create a tab-delimited text file. Open this file in WordPerfect and use Find/Change to change each carriage return code to a carriage return followed by an end-of-record code *and* a carriage return. (The carriage return is called a *hard return* in the Find/Change dialog box's Insert menu.) Next, use Find/Change to change each tab code to an end-of-field code followed by a carriage return. If you like, you can give descriptive names to each field; see the Merge section of the WordPerfect user guide for details. Save the resulting file as a WordPerfect document and then close it.

How to create a merge document: To perform the merge, choose New from the File menu, then choose Merge from the Tools menu. Double-click on the Start Merge option, and then select the primary and secondary files when prompted. WordPerfect inserts a page break between each form letter.

Other Mailing Options

I'VE CONCENTRATED ON WORD PROCESSORS and FileMaker Pro here, but these programs don't have a monopoly on mail merge. If you need fancier page-layout and typographic features than a word processor can provide, consider *database publishing*—combining data with a desktop publishing program. The basic concepts are similar, except you use a publishing program and a third-party utility to create the template documents. For Aldus PageMaker, the best database publishing tool is DataShaper (Elseware, 206/547-9623). For QuarkXPress, it's xdata (Em Software, 800/253-8472; 203/399-8472). Both programs also include a special font for printing the bar codes that enable you to obtain discounted postal rates. This nifty feature means you can send mass

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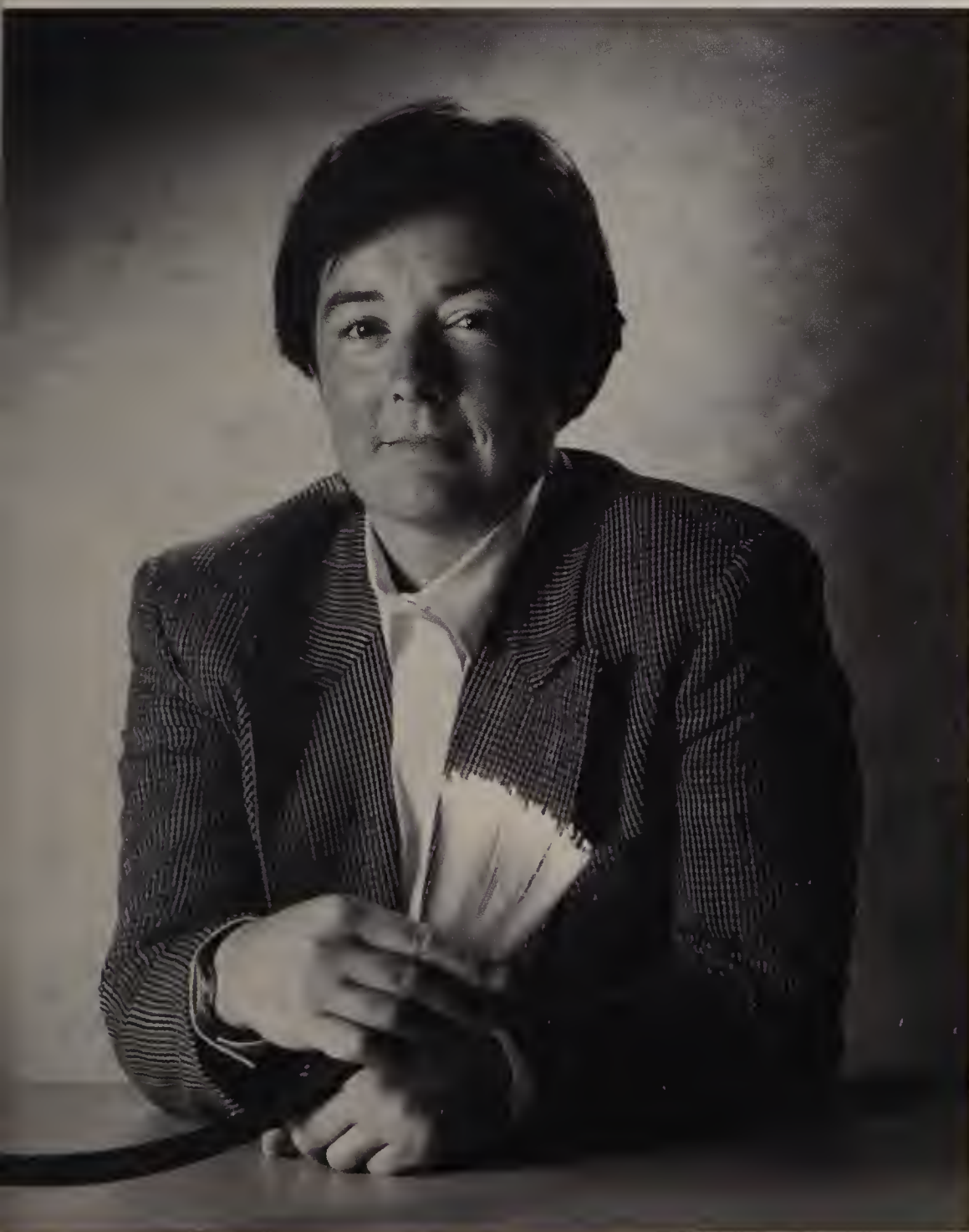
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Easier Merging

If you don't need conditional merges or the ability to supply information from the keyboard during a merge, you might consider using an integrated program for mail merge. ClarisWorks and Microsoft Works both have straightforward, approachable mail merge features that don't force you to grapple with text-only files, export and import, delimiters, and arcane field codes.

With either program, create the database document as you normally would. Next, create a word processor document containing the template text. Before continuing, be sure the database document is open.

How to: Microsoft Works To insert a field at a given spot, choose Merge Fields from the Document menu and select the desired database and field. Use the Print Preview command to preview the form letters. To print the letters, choose Print and check the Print Merge Fields option.

How to: ClarisWorks To insert a field in the template, choose Mail Merge from the File menu. Select the database and click on OK, then select the desired field. To print the letters, click on the Print Merge button in the Mail Merge dialog box.

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Contributing editor JIM HEID looks at a different aspect of Mac fundamentals each month. His latest book is the second edition of *Inside the Apple Macintosh* (Brady, 1992), which he coauthored with Peter Norton.

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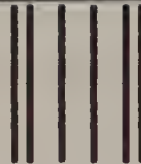
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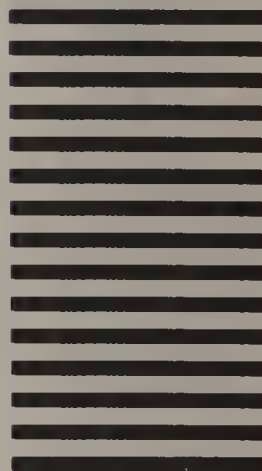
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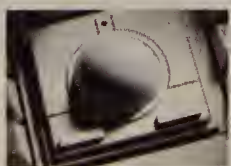
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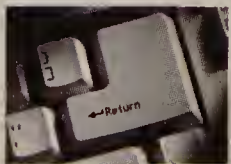
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PowerBook

Notes

Keeping Your Work in Sync

IF YOU USE TWO OR MORE COMPUTERS regularly, how can you be sure you have the most current files on whichever computer you are using? If you have a PowerBook, you probably have a desktop Mac as well, so you face this problem every time you switch from one to the other.

For years, people have transferred files from one Mac to another via floppy disk—renaming versions as needed. This process works adequately when you have only one or two files to transfer and can remember which computer has the most recent versions. But many projects involve multiple files—the monthly report that was once a simple text file might now include several graphics, a linked table from a spreadsheet, and a page-layout file, in addition to the text. And computerized address books and appointment schedulers must always be available and up-to-date. Even the most meticulous of us may have difficulty keeping track of which file versions are on which computer and whether every necessary file has been copied.

A new class of software addresses this problem by automatically *synchronizing* files between two Mac volumes. You specify two folders containing the files to be synchronized, and the program automatically copies the newer version of each file to the volume that contains the older one, so that both folders end up with an identical set of up-to-date files. If you create a new file in one folder, it is automatically copied to the other folder the next time you synchronize.

A volume can be any storage device recognized by the Finder: a hard drive, a floppy disk, a file-shared folder on another computer on a network, a PowerBook connected to a desktop Mac via SCSI cable. The volumes or Macs don't even have to be near each other; a PowerBook can connect to another Mac by modem



for synchronization through AppleTalk Remote Access (ARA).

Because they deal with two mounted volumes, synchronization programs need only reside on one computer, unless you use a floppy disk as the transfer medium. In that case the sync program should be on both computers, since both have to synchronize to the floppy.

Although the most obvious use of file synchronization is to keep a PowerBook and a desktop Mac in step, sync software is useful for many other functions. You can create backup disks organized by projects or folders. You can use sync software to distribute and maintain files throughout a company. Branch offices could gain access to central databases and a company bulletin board by modem, all synchronized with a network server.

The Features List

ALTHOUGH SYNCHRONIZATION programs began appearing only in the past year, six are already available and more

are on the way. The feature wars have begun (see "Comparing Sync Programs" for a summary of features found in each program). But what features do you actually need? To help you sort out the truly useful from the merely decorative, here's a description of each feature, starting with the most basic and important ones.

- *Synchronizes folders* All the programs offer this basic operation, directing you to specify two folders to synchronize. You then issue a synchronize command, and the program does the rest. If you only need to sync a few files regularly on your own computers, basic operation is probably sufficient.

- *Adds files* Some of the programs let you add files outside the designated folder for synchronizing and also allow you to synchronize files when the folders are organized differently.

- *Synchronizes multiple folders* What if you need to sync two or more projects, each with its own folders? You could put the folders in one larger folder and proceed with simple folder synchronization, but then you are organizing folders for synchronization rather than for your own logic. If you select multiple folders and save your selections, the sync process can adapt to your work.

- *Excludes files* Suppose your project folder contains some large graphics files that you need only on your desktop Mac. This feature lets you selectively exclude files from the sync process.

- *Resolves aliases* What happens if you put an alias in the folder for synchronization? Most sync programs do not resolve aliases—they treat an alias the same way the Finder does—they copy just the alias, not the original file. A few programs can resolve aliases by copying the original file; in rare cases this can create storage space problems if a large file has

continues

COMPARING SYNC PROGRAMS

Program	Zync 1.0a4	Synchronize 2.0 ¹	Inline Sync 1.0	PowerMerge 1.03	Norton Essentials 1.0	Magnet 1.01
Company	Ricardo Batista	Qdea	Inline Design	Leader Technologies	Symantec	No Hands Software
Telephone	available online	612/779-0955 800/933-9558	203/435-4995 800/453-7671	714/757-1787	408/253-9600	415/321-7340
Price	free	\$59	\$129	\$129	\$129	\$129.95
Adds files	○	○	●	●	○	●
Synchronizes multiple folders	○	●	●	●	in sets	●
Excludes files	○	●	●	●	○	●
Resolves aliases	○	●	○	○	●	○
Senses conflicts name/type	○/○	○/○	●/●	○/●	○/●	●/●
Senses if both files have been changed	●	○	●	●	●	●
Locks volume	○	●	○	●	○	●
Selects by attribute	○	●	●	●	exclude only	●
Maintains icon position and label	●	●	●	●	○	○
Performs scheduled synchronization	○	○	●	○	○	●
Allows background operation	○	●	●	●	○	●
Provides scripting	○	○	●	○	○	●
Displays activity logs	○	○	●	●	○	●
Displays both volumes' contents	○	limited ²	○	●	●	○
Keeps files compressed	●	●	○	●	●	●
Does synchronized deletion	○	○	○	○ ³	○	○ ⁴
Automatically synchronizes on disk mount/connect/shut down	○/○/○	○/○/●	○/○/●	●/○ ⁵ /○ ⁵	○/○/○	●/●/●

● = yes; ○ = no ¹ Formerly called Update. ² Shows files and folders to be synchronized; does not show full directories. ³ Upcoming version 1.1 will do this.

⁴ Upcoming version 2 will do this. ⁵ Upcoming version 1.04 will automatically sync on connect and shutdown.

many aliases. If your sync program doesn't resolve aliases, you'll have to be careful how you use them.

- *Senses name/type conflicts* If the folders to be synchronized contain two files with the same name but with mismatched attributes (for example, a text file named Building Plans and a graphics file with the same name), the sync program should warn you. Similarly, by checking the original date and time of file creation, a sync program should warn you if you have two independently created files with the same names and attributes.

- *Senses if both files have been changed* If you synchronize two versions of a file that were both changed since the last synchronization, you risk losing data as one overwrites the other. Some programs warn you and give you several choices: leave the file unchanged, copy both files (rename one), or simply overwrite one of them. You're likely to run into more problems if you use one of the many applications that automatically revise the file date and time whenever you open and save a file, even if you've made no changes to it. In a program like Aldus PageMaker—which always asks if you want to save changes when you close or quit—you can simply close the unchanged file without saving it. The danger, of course, is that if closing without saving becomes routine, you might someday forget to save a file you've actually revised. But some pro-

grams may not even give you that choice. For example, FileMaker Pro always changes the file date and time when you open a file; it has no save command.

- *Locks volume* Often, a central database file shouldn't be overwritten even if another volume has a later version of that file. If you lock a volume or file, you avoid the unwanted overwriting. Volume locking forces one-way synchronization; most programs alert you if both versions have changed.

- *Selects by attribute* Some programs let you sync files anywhere in a volume, based on their date (everything before, after, or between dates), file type, file creator, or label (color). You can, therefore, keep the files in any suitable location without reorganizing your folders for synchronization purposes. Such searches generally must cover entire volumes, so the process can be slow on large hard drives. Programs that select by attribute can usually exclude by attribute also.

- *Maintains icon position and label* A few programs optionally copy file icon positions and label, so the files appear in the same positions after synchronization.

- *Performs scheduled synchronization* Automatic synchronization can be scheduled at regular specified times—for example, to update computers every day at 6 p.m. or make backups at midnight.

- *Allows background operation* Most of the programs can operate in the back-

ground if you start another program, so you can continue working even during large file transfers.

- *Provides scripting* Scripting allows you to select a group of files or folders and perform a series of synchronization steps with different volumes. Functionally similar to a simple programming language, scripting is—by Macintosh standards—moderately difficult to set up.

- *Displays activity logs* Did you really sync that giant database? An activity log tells you what's been done and when.

- *Displays both volumes' contents* All programs let you browse a volume for folders or files you want to sync; only a few display both volumes at the same time along with synchronization status, a capability that makes searching simpler.

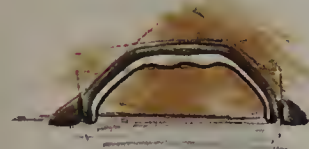
- *Keeps files compressed* Automatic file-compression programs such as AutoDoubler compress all or nearly all files on a drive and automatically decompress files copied to a floppy disk (manual compression programs compress only files you specify). Most synchronization programs let you leave AutoDoubler files compressed when synchronizing to a floppy disk so that the file remains small.

- *Does synchronized deletion* If you delete a file in one folder of a set, and the file remains in the other folder, the file reappears when you synchronize the folders. Synchronized deletion removes the

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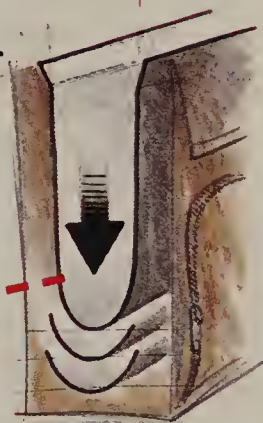
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The Difference

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file in the matching folder at the next synchronization. This feature should be used with care, since one advantage of having synchronized files is the ability to recover from an accidental deletion.

- *Automatically synchronizes on disk mount/connect/shutdown* Some programs automatically synchronize whenever a disk is mounted, upon connection to a network, and during shutdown.

No Perfect Fit

FOR ALL THEIR FEATURES, FILE-SYNCHRONIZATION programs still leave some gaps. If a folder or a file is too big for a floppy disk, you have to break it down first. None of the programs can synchronize across multiple floppy disks. Similarly, none support automatic compression to shoehorn more data onto a floppy. You must compress both versions of the files before syncing, and install decompression software on both computers.

Some problems cannot be easily addressed by any sync program. Many files need resources that are external to the file. A page-layout file, for example, may not include graphics, but only pointers to the necessary graphics files. A sync program knows nothing about pointers

and will not copy any separate graphics files. Similarly, there is no general, non-application-specific way to determine that a given file has subscribed to information published by another file.

Files use fonts and other system resources that cannot be easily found and automatically added to a list of files to sync. Any two Macs will almost certainly have different configurations, so once a file is synchronized, you may have to adjust page setup, modem initialization, and more.

Since a sync program copies the entire file, even if the two versions being synchronized are only slightly different—and they often are—the process is inherently inefficient. Copying only the changes in a file would be much faster. The most efficient method of extracting and copying only the changes between files would have to be application-specific, requiring special code within the application that creates the files. For example, a database program could track changes and then create a difference file to be merged with other copies of the file. I know of no program that currently has this capability.

UpDiff, a \$169 program from KyZen Corporation (609/354-3863), provides a more general solution. It compares two

versions of any file, then computes and creates a difference file that can be used with UpDiff to update other copies of the file. Because it must operate at both ends of a link, UpDiff is sold in pairs. It isn't nearly as efficient as a differencing function built into a program would be, but it takes less time than sending an entire file. Sync programs could incorporate its features in the future.

What if you synchronize Macs across different time zones? AppleTalk adjusts the time for networked computers, but if you synchronize using a SCSI connection or a floppy disk, time differences can trip you up. For example, say you sync your Mac, whose system clock is set to Pacific time, with a Mac on Eastern time (three hours later), and you change a file on your computer within three hours after synchronizing. When you resynchronize with the East Coast Mac, your changed file will be overwritten by the previously synchronized one, since the sync program thinks your changed file is actually the older of the two. (The MS-DOS program FileRunner does correct for time zones if you manually enter a profile for each disk and computer.) By the way, is your Mac's clock set accurately? (Most run fast; I'd never buy a watch with the accuracy of a Macintosh clock.)

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Making a Choice

ALL THE PROGRAMS I LOOKED AT worked reasonably well for straightforward synchronization. For basic folder synchronization, Zync, available from user groups and online services, works fine. And the price is right—it's freeware. (Zync's author, Ricardo Batista, says he will make no further upgrades to Zync.) If Zync does not meet your needs, check "Comparing Sync Programs" to find something that does. The synchronization feature of Norton Essentials—originally based on the code in Zync—is just part of a PowerBook utilities collection that includes power management and cursor highlighting. Synchronize offers greater functionality and simple operation at a modest price. The other programs are much more complex. Inline Sync and PowerMerge compete head-on; both have intricate status displays and are fairly difficult to master. PowerMerge has a slight edge in raw features, but Inline Sync's scripting might make it more appealing to power users. Magnet is conceptually the most flexible of all. You do have to learn how to use *magnets*, little agents that search for and manipulate files, but once you've done that you can use magnets to help with many file-main-

tenance functions, not just synchronization. While they can help organize your hard drive, they also create their own clutter. If you really need power—and most users don't—Magnet is the best choice.

If you need to synchronize files between a Mac and a PC, you should perform the synchronization on the PC side, because MS-DOS synchronization programs can handle Mac files in MS-DOS form more easily than Mac sync programs can handle MS-DOS files. (The Mac programs expect a lot of file information that MS-DOS doesn't supply.) Make sure to keep file names within the PC's eight-character limit even when you use the file on a Mac, to minimize confusion and constant renaming. FileRunner (\$69, MBS Technologies, 412/941-9076, 800/860-8700) synchronizes MS-DOS files, and the information you supply during its setup overcomes some of the MS-DOS file-information limitations (incidentally, a Mac version of FileRunner is in development). You can transfer MS-DOS files on a floppy disk to a Mac with an MS-DOS disk-mounting program such as Access PC (Insignia Solutions, 415/694-7600, 800/848-7677), DOS Mounter (Dana Communications, 801/531-0600), or Macintosh PC Exchange (Apple Computer). For cross-platform synchroniza-

tion, don't use the file-compression feature built into FileRunner, since the files can only be decompressed by FileRunner itself.

What the Future Holds

FILE SYNCHRONIZATION IS SUCH AN important feature of computing that operating systems will eventually be forced to incorporate at least basic synchronization features. Apple has been shipping a minimal backup program with its system software for several years, and System 7 has basic version control—it warns you if are about to overwrite a file with an older version.

In a few years we'll see a new kind of operating system, based on files as objects, that will manage version control and synchronization far more effectively. Object-oriented files could also effectively support a differencing function. But for now, file-synchronization software is the best option for people who routinely use more than one computer. ■

CARY LU is a *Macworld* contributing editor who covers PowerBook-related issues in this monthly column. He first wrote about the need for synchronization software in the fall of 1983.

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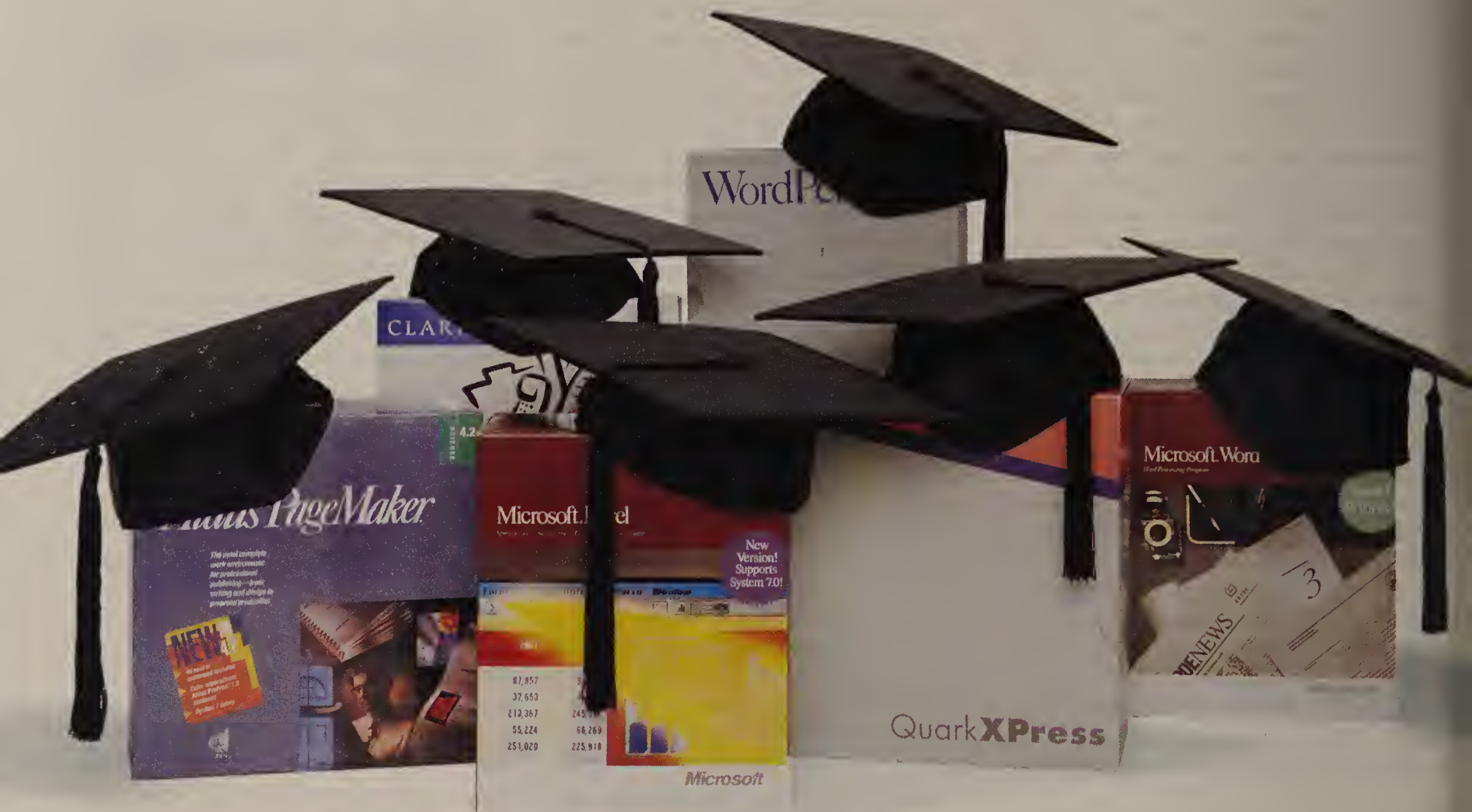
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★★★★★ Best ————— Worst ★

Software

ACCOUNTING/FINANCE

★★ **Business Sense 1.6, Business Sense, 307/877-2231, \$199.** Competent, single-user, all-in-one bookkeeping package will adequately help you keep the books for a small company, but it's not as easy to use as its competition. Feb 93

★★★★ **Components 1.0, Satori Software, 206/443-0765, \$795 per module.** Simple, flexible architecture sets a new design standard for Macintosh accounting software, but is not without its bugs and flaws. Sep 92


 **Great Plains Accounting 6.0 (6.1), Great Plains Software, 701/281-0550, \$795.** High-end bookkeeping software offers a first-rate lineup of dedicated modules. Different individuals or groups can easily use the various accounting functions.


★★ **HyperTax Tutor 1991, Soft5stream International, 508/991-4011, \$99.** If you're willing to put up with a design that's neither intuitive nor easy to use, this cross-referenced book contains extensive explanations, strategies, and examples of complex IRS tax laws. Apr 92

★★★ **Job Cost/Time Billing 1.05, Satori Software, 206/443-0765, \$1495.** Professional billing software incorporates high-end job-cost and accounts-receivable features in one module, plus an excellent report function; but confusing elements, minor bugs, and inaccuracies in the documentation are weaknesses. Aug 92

★★★★ **MacInTax 1991, ChipSoft, 619/453-8722, \$79.95.** On-screen replicas of IRS forms ease the preparation of tax returns in this personal income tax software, but the help text (lifted straight out of IRS documents) is unclear. Apr 92

★★★★ **Managing Your Money 5.0, MECA Software, 203/256-5000, \$79.95.** An already strong financial-management program becomes easier to use and slightly more powerful with this upgrade. Jan 93

 **MYOB 3.0, Teleware, 201/586-2200, \$199.** A file-cabinet metaphor makes the interface of this accounting package easy to use and understand. For an accounting system with one user who has no need for payroll capabilities, it's the best choice.

 **Quicken 3.0, Intuit, 415/852-9696, \$69.95.** Track assets, liabilities, income, and expenses with this personal-finance package. It has a good Mac interface and is easy to learn and use.

★★★★ **Timeslips III 2.1, Timeslips Corp., 508/768-6100, \$299.95.** Complexity is the price you pay for this time-billing utility's impressive flexibility. Fortunately, thorough documentation, excellent tech support, and default settings help any user get started. Sep 92


BUSINESS TOOLS

★★★★ **4th Dimension 3.0.1, ACI US, 408/252-4444, \$895.** Multitasking, which greatly improves speed when used carefully, makes this upgraded relational database delightful for both developers and end users. It's impressively easy to use for a relational database. Apr 93

★★★ **Aspects 1.01 (1.03), Group Technologies, 703/528-1555, \$285 to \$1295.** Collaborative software allows up to 16 people to edit a project. Controlled access as well as individual and linked views are good features, but the lack of outlining and spreadsheet modules limits its usefulness. Jun 92

★★★★ **Atlas Pro 1.0.6 (1.5), Strategic Mapping, 408/985-7400, \$795.** Although this mapping software is not a complete geographic-information system, it boasts a rich feature set and a competitive price. Nov 92

★★★ **Bar Code Pro 1.0, Synex, 718/499-6293, \$450.** Easy-to-use desk accessory creates bar codes in EPS or PICT for use in desktop publishing or labeling programs. It does well what it sets out to do, but lacks automatic sequential coding and fails to catch invalid characters. Sep 92

 **Clarix Resolve, Claris Corp., 408/727-8227, \$249.** Advanced features come within easy reach of spreadsheet pedestrians with this program. Anyone can learn how to use it in 10 minutes and how to customize it in 20.

★★★★ **DataPivot 1.02 (1.1), Brio Technology, 415/961-4110, \$299.** Convenient and flexible report-generator includes fast formatting, automatic im-

port, and almost every other item on the wish list of users who need report tables that emphasize cross-tabulation. May 92

★★★★ **DeltaGraph Professional 2.01 (2.02), DeltaPoint, 408/648-4000, \$295.** A smooth interface and outstanding technical support are only two of the stellar features in this graphing and charting program. This upgrade adds 13 new chart types and a number of presentation capabilities. May 92


★★★★ **Fair Witness 1.1 (1.2), Chena Software, 215/770-1210, \$295.** A valuable tool for planning any project, this software coherently integrates outlining, information charts, scheduling, and time charts. Oct 92

★★★★ **FileMaker Pro 2.0, Claris Corp., 408/727-8227, \$399.** Easier scripting, improved mailing labels and text-handling, and support for QuickTime and Apple events are the major new features of this upgraded, multiuser, flat-file database. Although it has some minor bugs, this is a strong upgrade to an excellent program. Jan 93


★★★ **FlowChart Express 1.0, Kaetron Software Corp., 713/890-3434, \$149.** Inexpensive, easy-to-use flowchart software readily meets the needs of most flowchart creators, although those with extensive requirements will still need a larger, more powerful feature set. Jan 93

★★★★ **GeoQuery 3.02, GeoQuery Corp., 708/357-0535, \$395.** Gain geographic perspective with this custom-map generator and data-analysis software that uses zip codes to create "pushpin" maps of files from your spreadsheet or database. Nov 92

★★★★ **GraphMaster 1.31a (1.33), Visual Business Systems, 404/956-0325, \$295.** Excellent general-purpose charting and graphing program offers a number of unusual features, including pictographs and 360-degree free rotation. A frequent inability to undo actions is the only serious irritation. May 92

 **GreatWorks 2.0, Symantec, 408/253-9600, \$299.** High marks to this integrated program for including an outlining module and a color paint module. While the integration may not be ideal, it's a solid program, worth a close look.

★★★★ **Lotus 1-2-3 for Macintosh 1.0 (1.1), Lotus Development Corp., 800/343-5414, \$495.** Spreadsheet program from the other side holds its own against Mac competitors. Its many strengths include graphing, well-implemented linking, compatibility with the DOS version, and an outstanding Help system. Apr 92

 **MacProject II, Claris Corp., 408/727-8227, \$599.** Draw task boxes and connect them with lines that define project logic using this project-management software. It links with Resolve to produce seven types of graphs and tables, but other programs offer more elaborate reporting and scheduling options.

continues



Star Ratings

★★★★ **Microsoft Excel 4.0, Microsoft Corp., 206/882-8080, \$495.** Create impressive spreadsheets with this upgrade that includes all the features you wished for and more. It's slower, and now needs 2MB of RAM for practical use, but almost all users will want to upgrade. Oct 92

★★★★ **Microsoft Project 3.0, Microsoft, 206/882-8080, \$695.** An amazing range of functions, including new scheduling and formatting, are packed into this upgraded project-management software. The improved tool bar helps novices schedule tasks with push-button ease. Jan 93

★★★ **Microsoft Works 3.0, Microsoft, 206/882-8088, \$295.** Capable but unspectacular upgrade delivers marginally improved functionality and a welcome face-lift to this integrated program, but there are a number of incompatibilities, odd design choices, and performance flaws. Feb 93

★★★★ **Muse 1.0 (1.01), Occam Research Corp., 617/923-3545, \$695.** Innovative data-analysis software is based on a large, ambitious vision of how to organize and use data, and is an excellent environment for some data handling. Free-form query language is powerful, but easy to misread. Jun 92

★★★★ **nuBase Pro 1.5 (1.54), Tactic Software Corp., 407/832-6691, \$395.** Although still slower than FoxBase and without the rich feature-set of 4th Dimension, this is the only relational database that makes it possible for users with no programming experience to design a useful database. Sep 92

★★★ **Office Manager 2.1 (2.2), White Crow Software, 802/658-1270, \$99.** Simple contact- and project-management software is powerful for small databases, but reliance on HyperCard limits its usefulness for low-end Macs. Dec 92

★★ **Office Wiz 1.1 (1.1.2), Oryx Associates, 415/563-9971, \$695.** 4D-based program attempts to integrate calendar, project, and contact management, as well as simple accounting for a multiuser environment, but the complexity of the interface requires a substantial investment in start-up time. Nov 92

★★★ **Omnis 7 1.1, Blyth Software, 415/312-7100, \$1250.** The plain, businesslike functionality of this database-development system produces solid applications without much fuss. Dec 92

★★★★ **Panorama 2.0 (2.06), ProVue Development Corp., 714/892-8199, \$395.** Disarmingly easy-to-learn flat-file database is full of labor-saving data-entry features, plus it boasts a remarkable macro function that lets you record and play back almost any series of database routines. May 92

★★ **PEMD Discovery 1.3.1, PEMD Education Group, 707/894-3668, \$189.** Unsophisticated data-search and -retrieval routines, limited displays, and a weak manual restrict this graphical data-analysis software's usefulness. Apr 92

★★★ **Perspective 1.5, U.S. Data on Demand, 800/352-7352, \$129.95.** The level of detail and comprehensive information in this collection of U.S. demographic and economic data is impressive, and the reasonable price puts it within reach of even the smallest business. Sep 92

★★ **PowerPlay 1.0 (1.1), Cognos, 617/229-6600, \$695.** A good program for a very limited range of business-analysis tasks. The views of data and graphs are small and manageable, and the program tabulates them in

several colorful ways. Aug 92

★★ **PowerTrax 1.1 (1.2), Soft Solutions, 404/457-9400, \$495.** Convolved and repetitive data-entry processes slow you down when they should speed you up in this 4D-based information-management system. Apr 92

★★★ **RateFinder 1.5 (1.6), Elefant Software, 510/843-7725, \$99.** Numerous interface violations don't change the fact that these all-inclusive shipping-rate tables make the old-fashioned chore of checking mail rates easier and more efficient. Jun 92

★★★★ **ZP4 7 (10), Semaphore Corp., 408/688-9200, \$125.** Clean up and standardize addresses with this CD ROM, thereby reducing postage costs and avoiding undeliverable mail; uses a licensed version of the U.S. Postal Service's official database of every valid postal address in America. May 92

COMMUNICATIONS / NETWORKS

★★★ **A/UX 3.0, Apple Computer, 408/996-1010, \$709.** Hybrid-operating-system package implements the Stone Age, type-one-line-at-a-time text interface of Unix in a way a Macintosh user might actually like. Nov 92

★★★★ **AccessPC 2.0, Insignia Solutions, 415/694-7600, \$99.95.** Slick control over formatting multiple types of DOS media is the major advantage of this file-transfer utility. Oct 92

★★★ **Carbon Copy for the Mac 2.0 (2.04), Microcom, 919/490-1277, single-user \$99, multi-user \$299.** Screen-sharing utility is convenient and economical for occasional use but because it competes for RAM on attended low-memory Macs, it isn't efficient enough to use as a global solution for remote-control support. Apr 92

★★★ **CompuServe Information Manager 2.0.1, CompuServe, 614/457-8600, \$49.95.** The goal of this product is to give friendlier information-access to CompuServe for Macintosh users. An appealing color interface and increased speed are signs of success, but there's still room for improvement. Dec 92

★★★ **DataClub Classic, DataClub Elite 2.0, Novell, 800/638-9273, \$175, \$1395.** Fully distributed file servers allow users to pool the free space on their drives into one virtual server. File sharing is transparent, but when a participating Mac disconnects from the network, users lose access to files stored on its hard drive. Aug 92

★★★★ **DOS Mounter 3.0, Dayna Communications, 801/531-0600, \$89.95.** If you need to use wild cards in extension mapping, this file-transfer utility is the only option, although it's slower than other file-transfer programs. Oct 92

★★★★ **Macintosh PC Exchange 1.01, Apple Computer, 408/996-1010, \$79.** For basic file-transfer, this control panel device allowing cross-platform file sharing is fine, but it's hardly state-of-the-art. Oct 92

★★★ **MicroPhone II 4.0 (4.0.2), Software Ventures Corp., 510/644-3232, \$295.** Refinements are evident throughout this telecommunications software's upgrade, but not everyone needs \$295 worth of sophistication. The impressive scripting facility is countered by poor help features. Jul 92

★★★ **NetMounter 1.00 (1.01), Dayna Communications, 801/531-0600, \$99.** Reasonably priced

utility provides Macs access to NetWare file servers without your having to install NetWare for the Macintosh on the server. It's not an ideal choice, but it is economical for mixed networks with only a few Macs. Sep 92

☐ **NetWare for the Macintosh 3.011, Novell, 800/638-9273, \$495-1995.** NetWare 3.11, an expensive but robust network operating system, runs on a non-Mac dedicated server and is complex to manage. This set of NetWare Loadable Modules lets you add Macs to a NetWare network.

★★★ **Network SuperVisor 2.0.1 (2.1), CSG Technologies, 412/471-7170, \$495.** Fast and accurate data collection is the strong point of this network-management utility, but the interface isn't that intuitive. Aug 92

★★★ **Network Vital Signs 1.0 (1.1), Dayna Communications, 801/531-0600, \$449.** Fault-monitoring application continually watches selected network devices and services, monitoring specific equipment for specific errors. Unfortunately, when monitoring more than ten devices, it noticeably degrades the performance of the monitoring Mac. Mar 93

★★★★ **NetWorks 1.0.1 (2.0), Caravelle Networks Corp., 613/596-2802, \$1195.** Become a network demigod with omnipresent capabilities over network devices using this network-management and paging utility. *Macworld's* network manager loved it, calling it versatile, flexible, and worth its weight in gold. Jun 92

★★ **Notify 1.0, Ex Machina, 718/965-0309, \$149.** Innovative wireless transmitter uses the Mac to send messages to pager. It's a start on a new technology, but the quirky product has a long way to go. Jun 92

★★★★ **PacerForum 1.0.1, Pacer Software, 619/454-0565, \$549.** Any file server or underused networked Mac can host an online forum using this network bulletin board system. The well-designed graphical interface stands out, although the display looks better on color monitors. Jul 92

★★★★ **RouterCheck 2.0, Neon Software, 510/283-9771, \$895.** Keep your finger on the pulse of router configurations and internet traffic with this network-administration utility. It's a must for midsize or larger internets, but too pricey for small networks. Oct 92

☐ **SoftPC 2.0 (2.5), Insignia Solutions, 415/694-7600, \$399.** A graceful implementation of the PC architecture on a Mac, this program emulates PC AT hardware through a powerful BIOS that remaps Intel 80286 addresses to a Motorola 68000-series CPU. The main drawback is slowness.

★★★ **Status Mac 2.0.2 (3.0), On Technology, 617/876-0900, \$449.** With less hassle for network managers and users, this upgrade invites customization in both the collecting and storing of information about networked Macs; users can even delay time-consuming profiling. May 92

★★★★ **TechWorks Net Utilities 1.0, Technology Works, 512/794-8533, \$129.** Collection of five separate applications provides essential network-monitoring tools at a price that would please anyone. Dec 92

★★★★ **Timbuktu 5.0.1, Farallon Computing, 510/814-5000, single user \$199, multiuser \$999 to \$5500.** By letting one computer (a Mac or a Windows-based PC) control, observe, or exchange data with another computer, this terminal-emulation product allows

you to use resources almost anywhere on a network. Despite minor blemishes, such as its inability to cut and paste between Macs and Windows PCs, it's a clear winner. Mar 93

☑ **VersaTerm/Pro 3.1 (3.6.2), Synergy Software, 215/779-0522, \$295.** It's a great tool for working with VAXs or when you want Textronix-terminal emulation, but this communications software lacks the scripting many people use for working with BBSs or commercial information services.

★★ **Vicom Terminal Emulators (4.2), Vicom Technology, 604/684-9517, \$195 to \$3500.** These bare-bones, British-designed terminal emulators lack many common U.S. modem configurations, but do support multiple simultaneous sessions. Aug 92

☑ **WhiteKnight 11 (11.14), The FreeSoft Company, 412/846-2700, \$139.** In the right hands, this product is the precision tool of communications software, but it does assume familiarity with telecommunications and with programming concepts.

DESKTOP PUBLISHING

☑ **Adobe Type Manager (ATM) 1.0 (2.03), Adobe Systems, 415/961-4400, \$99.** Radically improve the quality of screen fonts and the versatility of QuickDraw printers with this font-optimizing utility that uses information from a printer font (also called an outline font) to produce accurate character representations on-screen.

★★★ **Aldus PageMaker 4.2, Aldus Corp., 206/628-2320, \$795.** Interruptible screen redraw is one of the dozens of enhancements that make this upgrade well worth its price. Even so, some of the features that users need the most—opening multiple documents, for instance—are still missing. May 92

★★ **Aldus Personal Press 2.0, Aldus Corp., 206/628-2320, \$199.** Basic, inexpensive page-layout program adds features and gains strength, but is still missing elements that novice users need, such as automatic kerning. Furthermore, its software-knows-best approach to copyfitting makes manual fine-tuning difficult and is almost certain to confuse and confound beginners. Mar 93

★★★ **Apple Font Pack, Apple Computer, 408/996-1010, \$99.** Apple's first collection of TrueType fonts includes only 12 fonts that haven't been available since the late eighties in the PostScript format. Still, it's not a bad deal, considering that Adobe PostScript fonts cost four times as much. Mar 93

★★★★ **Fontographer 3.5, Altsys Corp., 214/680-2060, \$495.** Versatile tools that enable you to edit PostScript typefaces or create your own are the highlight of this font-design software. But beware, some processes are technical and cumbersome. Nov 92

☑ **FrameMaker 3.0 (3.0.1), Frame Technology, 408/433-3311, \$795.** Powerful and well-designed, this page-layout software is the best choice for scientific and technical publishing. It has a fine table editor and allows manual kerning, but its power demands commitment—and a Mac II-class machine.

★★★ **LetraStudio 2.0, Letraset USA, 201/845-6100, \$249.** Precise, intuitive control over character spacing and shapes, as well as a straightforward interface, make this program a great choice for manipulating type, but it lacks flashy effects, such as gradient fills. Oct 92

★★ **MacQuill 1.0, Nest Software, 408/441-**

1944, \$99.95. Friendly, inexpensive page-layout program is missing basic features, such as kerning and importing, and suffers from some bugs and deficiencies, but for simple word processing and grass-roots page layout it's serviceable. Aug 92

★★ **MenuFonts 4.03 (4.04), Dubl-Click Software, 818/888-2068, \$69.95.** A control panel device that groups type styles in families and displays font names in their own typefaces sounds like a great idea, and it would be if there were fewer incompatibilities. May 92

★★★★★ **Multiple Master Myriad 1.0, Adobe Systems, 415/961-4400, \$370.** Elegant execution and functional design combine in this two-axis Multiple Master typeface that exceeds all previous ideas of electronic font perfection. Jul 92

★★★ **Personal Font, Signature Software, 408/458-0241, \$179.95.** Turn your handwriting into a PostScript Level 3 or a TrueType font. The results are good, although not perfect—TrueType letters were not connected on screen, but this should be corrected with TrueType 2.0. Dec 92

★★★ **Publish It Easy 3.0, Timeworks, 708/559-1300, \$199.95.** Desktop-publishing program offers writing, editing, formatting, page-layout, drawing, and painting tools with well-thought-out interface innovations, plus an excellent database manager. Unfortunately, the program is unstable and crash-prone. Mar 93

★★★★ **QuarkXPress 3.1, Quark, 800/788-7835, \$895.** Dozens of updated features and frustration-relievers in this upgrade include new palettes and preferences, better zooming, and improved text-editing and -formatting. The program, while still not perfectly behaved, is stable, well designed, and full-featured. Jul 92

★★★ **Renaissance 1.0, Eastman Kodak, 800/433-2839, \$695.** A strange mixture of power and oversight, this page-design and -layout software provides several slick features, including handling multiple page sizes simultaneously, but blatantly ignores common Mac conventions, such as some keyboard shortcuts. Dec 92

★★★★ **Spectacular 1.2, FontHaus, 203/846-3087, \$79.95.** Keep track of fonts efficiently and effectively with this type-specimen generator. Printing specimen sheets is a cinch. Jan 93

EDUCATION

★★★ **American Discovery 3.0, Great Wave Software, 408/438-1990, \$49.95.** Without glitzy graphics or sound, this educational game, intended mainly for classroom use, provides an excellent drill in geography, state capitals, and state facts. May 92

★★★ **The Castle of Dr. Brain 1.0, Sierra Online, 209/683-4468, \$49.95.** After applying for a job as a lab assistant with the local mad scientist, you must use logic and raw brain-power to navigate a series of rooms, mazes, and hallways on the way to your interview. Puzzles range from simple and mundane to creatively laborious. Dec 92

★★★ **Eco-Adventures in the Ocean, Eco-Adventures in the Rainforest 1.0, Chariot Software Group, 619/298-0202, \$59.95.** Explore the ocean or rainforest while avoiding pitfalls and predators in these educational adventure games. Imaginary landscapes that combine features found in different environments may confuse some students. Nov 92

★★★ **Headline Harry and the Great Paper Race 1.0, Davidson & Associates, 310/793-0600, \$59.95.** Travel through time and across the country as a journalist in this history/geography game. While not an educational masterpiece, it is lots of fun. Dec 92

★★★ **MacGlobe 1.3.0, Broderbund Software, 415/382-4400, \$59.95.** Besides maps and bits of fun, such as national anthems, this geography software offers an impressive quantity of demographic and economic information. While it could stand some improvement in data export, it provides a fascinating intellectual adventure for home and school use. Feb 93

★★ **Math Shop, Math Shop Jr., Advanced Math Shop 1.0, Scholastic, 800/541-5513, \$24.95.** The humdrum workbook format is converted into bits and bytes with these mathematics education games. May 92

★★ **NihongoWare, Vol. 1, Qualitas Trading Company, 510/848-8080, \$623.** Although this Japanese language CD ROM offers solid instruction, it's so expensive and so limited in its word selection that it's not an economical choice for individual users. Jan 93

★★★★ **Number Munchers 1.1 (1.2), MECC, 612/569-1500, \$29.95 to \$69.** Fun, educational game builds arithmetic skills through arcade action. Munchers gobble your choice of multiples, factors, primes, equalities, and inequalities, but the game can't accept custom data sets. Jun 92

★★ **Picture It 1.0 (1.4), Penton Overseas, 619/431-0060, \$69.95.** If you add custom word lists, this interactive French-English picture dictionary may serve as a decent aid to a more complete curriculum, but it's buggy and of uneven quality. Aug 92

★★★ **StudyWare for the SAT 3.7N (4.0), Cliffs Notes, 402/423-5050, \$49.95.** Four full SATs, a TSWE (Test of Standard Written English), and a series of drills are included with this inexpensive SAT-training program. It doesn't provide a lot of tutorial assistance, but may be appropriate for students who need a quick brushup. Jun 92

★★★★ **Super Munchers 1.0, MECC, 612/569-1500, \$49.95 to \$69.** From a kid's point of view, this educational arcade game offers long-lasting appeal. The player maneuvers a cartoon Muncher around a game board, gobbling up words that fit target rules, such as Romantic composers or European countries. Jun 92

★★★ **Time Treks 1.0, Earthquest, 415/321-5838, \$59.95.** An eccentric archaeologist opens portals through time, and you must close them in this educational, HyperCard-based game. Slow response time and limited animation and color are somewhat disappointing, but overall it's a fun way to browse through history. Sep 92

★★★★ **Transparent Language 1.04M, Transparent Language, 603/465-2230, \$139.** Without an iota of glitz or glamour (no sound, graphics, color, or buttons), this foreign-language reader is a superb tool for bolstering language skills through reading. Oct 92

★★★★ **Where in America's Past Is Carmen Sandiego?, Broderbund Software, 415/382-4400, \$44.95.** Travel through time and the United States while chasing those V.I.L.E. crooks in this clever educational history/geography game that's challenging for all ages. Mar 93

★★★★ **Where in the World Is Carmen**
continues



Star Ratings

Sandiego? Deluxe Edition, Broderbund Software, 415/382-4400, \$79.95. The V.I.L.E. gang is at it again, stealing famous objects and fleeing to locations around the world. In this deluxe version of the well-known geography game, there are more crooks, more clues, and more countries to visit. **Oct 92**

★★★★ **Word Munchers 1.0 (1.2), MECC, 612/569-1500, \$29.95 to \$69.** Munch the words with matching vowel sounds in this educational game for grades 1 to 5+. Dazzling color graphics stand out, but the repetitive cartoon sequences get tiresome. **Jun 92**

★★★★ **World Atlas 1.2, Software Toolworks, 415/883-3000, \$79.95.** Extensive, detailed maps of countries and regions are the highlight of this atlas software. In addition, descriptive headings report interesting text-based demographic data. **Apr 92**

ENTERTAINMENT

★★★★ **4-D Boxing 1.0, Electronic Arts, 415/571-7171, \$49.95.** Authentic motion and multiple viewing angles are the best features of this entertaining boxing game, but off-disk copy protection, geometric figures, and the inability to save games in progress make it less enticing. **Sep 92**

★★ **America Alive, MediaAlive/CD Technology, 408/752-8500, \$99.** QuickTime movies, color photographs and maps, text, and audio mingle in this multimedia CD ROM guide to the United States. It's a promising concept, but it doesn't yield much useful information. **Mar 93**

★★★★ **Audioshop 1.0 (1.03), Opcode Systems, 415/856-3333, \$89.95.** Audiophiles will get a kick out of applying sound effects to any sound file on their Macs. You can also control the order of songs or sounds on an audio CD played on a CD ROM player. A number of quirks may confuse new users. **Sep 92**

★★★★ **Battle Enhanced Chess CD ROM, Interplay Productions, 714/553-6678, \$79.95.** Elaborately detailed cartoon characters act out little dramas of strategy and capture, complete with sound effects, in this chess game that will drive nine-year-olds mad with glee but may annoy experienced chess players. **Mar 93**

★★★★ **The Battle of Britain, Deadly Games, 215/295-2284, \$54.95.** It's August 10, 1940. The badly outnumbered British must defend their country against the invading Luftwaffe, and you're in charge. Although the graphics and sound are not spectacular, this is an entertaining, thinking person's game. **Dec 92**

★★★★ **Blade 1.1, Leviathan Corp., 313/826-3560, \$99.95.** Surreal graphics in this fantasy martial-arts game are spectacular—a cross between Dali and Seuss—but the arcade action is extremely difficult to master. **Sep 92**

★★★★ **Capitalist Pig 1.0 (1.02), Pluma Software, 602/969-9441, \$59.95.** Terrorist attacks, embezzlement, fires—keeping a cool head is half the challenge if you are to become successful in this business-simulation game. No clear end point means that getting rich, retiring, and writing novels is not an option. **Sep 92**

★★★★ **The Complete Annotated Alice 1.0, The Voyager Company, 310/451-1383, \$19.95.** Fans of *Alice's Adventures in Wonderland* will love the "lost" out-of-print chapter in this HyperCard book designed primarily for PowerBook users. As literary hypertext hide-and-

seek, it works. **Jun 92**

★★ **Creepy Castle 1.0, Reactor, 312/573-0800, \$49.95.** Wolfman, the Bride of Frankenstein, and other ghouls from classic horror movies populate this clever arcade-style game. Still, delightful movie trivia doesn't compensate for frustrating performance delays and limited scenarios. **Jun 92**

★★★★ **Cross Country 1.0 (2.0), T-34 Microsystems, 904/396-2785, \$179.95.** No unnecessary frills complicate this efficient, inexpensive instrument-flight trainer. It doesn't have a true aerodynamic feel, but that flaw's not critical. **Jul 92**

★★★★ **Cyberblast 2.01, Innerprise Software, 410/560-2434, \$49.95.** Aliens have overrun the 64 levels of Fastrax Labs, and it's your job to get rid of them in this arcade game. While it's not the most unusual game in the universe, it's a nice, basic shoot-'em-up, with clever execution and appealing graphics. **Sep 92**

★★★★ **Go Master 5, Toyogo, 808/396-5526, \$69.** Go has been called the most interesting board game ever invented. This excellent software version incorporates helpful learning aids and sample games. **Dec 92**

★★★★ **HardBall II, Accolade, 408/985-1700, \$54.95.** From the pitcher's windup to the batter's swing, this baseball game comes astonishingly close to natural human motion. The upgrade adds more teams, more stadiums, instant replay, and the ability to create your own league. **May 92**

★★★★ **Insanity 1.0, UV Wave, 318/868-9944, \$28.95.** Shoot your Mac with this cool control panel device that offers a choice of nine weapons, ranging from an Uzi to a pigeon. It has first-rate sound effects and detailed animation, but the novelty wears off. **Feb 93**

★★★★★ **Just Grandma and Me, Broderbund Software, 415/382-4400, \$49.95.** Mercer Mayer's Little Critter comes to life in this charming, captivating, wondrously entertaining, interactive storybook on CD ROM. **Aug 92**

☐ **Kid Pix 1.0 (2.0), Broderbund Software, 415/382-4400, \$59.95.** An entrancing, enchanting color paint program aimed at children but delightful for grown-ups, too. Hilarious sounds, hidden surprises, spectacular effects, zany and creative tools—it's a classic.

★★★★ **Kid Pix Companion, Broderbund Software, 415/382-4400, \$39.95.** Addition to Kid Pix adds clever new features, including the world's easiest-to-use QuickTime movie and presentation modules, but it's less appealing than the delightfully simple original. **Oct 92**

★★★★ **Nobunaga's Ambition 1.0, Koei Corp., 415/348-0200, \$59.95.** Visit the Warring States period of feudal Japan, unify the country, and usher in an era of peace. Strategy game is absorbing and challenging, but the interface can be annoying. **Jun 92**

★★★★ **Patton Strikes Back: The Battle of the Bulge, Broderbund Software, 415/382-4400, \$19.95.** Military simulation game with superior graphics is simple to learn and satisfyingly complex. If only they'd skipped the off-disk copy protection. **Jun 92**

★★★★ **Poetry in Motion, The Voyager Company, 310/451-1383, \$29.95.** Performance videos of contemporary poets are juxtaposed with the texts of their poems and taped interviews in this intriguing CD ROM that combines the excitement of the stage with the reflective appeal of the page. **Feb 93**

★★★★ **Prince of Persia, Broderbund Soft-**

ware, 415/382-4400, \$49.95. A high tolerance for frustration is necessary to negotiate the 12 mazelike levels of dungeon and palace in this arcade adventure, but amazingly realistic (although gory) animation, stunning graphics, and entertaining challenges make it all worthwhile. **Sep 92**

★★★★ **Red Baron 1.0, Dynamix, 800/326-6654, \$69.95.** The romance of history and the realism of a flight simulator combine in this World War I flight game. Despite small annoyances, including too many dialog boxes to get to the simulation, this game will charm any aspiring ace. **Nov 92**

★★★★ **Rodney's Wonder Window, The Voyager Company, 310/461-1383, \$39.95.** Collection of 23 colorful, wacky graphics and animations by Rodney Alan Greenblatt is charming but uneven. The overall look is surreal and cartoonish, but while some modules are elaborate and sophisticated, others are simple and not particularly interesting. **Mar 93**

★★★★★ **The Secret of Monkey Island 1.0, LucasArts Games, 415/721-3300, \$59.95.** A genuinely amusing, interactive tale of swashbuckling and daring deeds using splendid 256-color graphics and an original soundtrack. Low screen resolution and irksome copy protection only slightly spoil the delight. **Sep 92**

★★★★★ **Shanghai II: The Dragon's Eye, Activision, 310/207-4500, \$49.95.** Classic tile game is more addictive than ever; flashy enhancements include new tiles and layouts, plus an additional, entirely new game that's a variation on the tile-removal theme. **May 92**

★★ **Sherlock Holmes, Consulting Detective 1.0, Icom Simulations, 708/520-4440, \$69.95.** Accompany Sherlock Holmes and Watson as they investigate three CD ROM-based mysteries. Primarily made up of video scenes, this game's only slightly more interactive than TV, and the picture's not as good. **Aug 92**

★★★★★ **A Silly Noisy House 1.0, The Voyager Company, 310/451-1383, \$59.95.** A brightly colored animated world awaits exploration; this CD ROM's simple scenes and syrupy songs are perfect for preschoolers. **May 92**

★★★★★ **SimAnt 1.0, Maxis, 510/254-9700, \$59.95.** Marauding red ants, ant lions, spiders, even power mowers—an ant's life is likely to be short in this remarkably detailed simulation game in which the object is to have black ants amass territory in a suburban backyard. **Apr 92**

★★★★ **SimLife, Maxis, 510/254-9700, \$69.95.** A megalomaniac's dream come true, this amazingly intricate simulation game allows players to create and control ecosystems. It's not easy, but the reward is an increased understanding of the complex interrelationships of life. **Feb 93**

★★★★★ **So I've Heard, Volume 1: Bach and Before, The Voyager Company, 310/451-1383, \$24.95.** Engaging text by classical-music critic and lecturer Alan Rich describes nearly two millennia of western music (up to the mid-eighteenth century) in this CD ROM. It offers a unique and affordable opportunity to sample 50 or so performances, styles, and compositions. **Feb 93**

★★★★★ **Spaceward Ho 2.0.1, Delta Tao Software, 408/730-9336, \$59.** A happy planet is a profitable planet in this absorbing, humorous strategy game of interstellar capitalism and imperialism. **Aug 92**

★★★★★ **Spectre 1.0, Velocity Development Corp., 415/776-8000, \$59.95.** Fight enemy tanks

in a 3-D arcade game that is at once basic and extremely addictive. When installed on a network, it's one of the great antiproductivity tools of all time. **May 92**

★★★★ **Spelunx and the Caves of Mr. Seudo, Broderbund Software, 415/382-4400, \$49.95.**

Unanticipated giggles, rich graphics, entertaining sounds, and creative learning activities fill this interactive hyperworld. We recommend it, despite its tiny bugs. **Jul 92**

★★★★ **Super Tetris, Spectrum HoloByte, 510/522-3584, \$49.95.** Teensy tiles are a very minor negative in this exceptional tile game that's more varied, more challenging, and more forgiving than the original. **Oct 92**

★★ **Surgeon 3, The 8rain 1.0 (1.1), I5M, 410/560-0973, \$59.95.** Surgical-simulation game with realistic graphics and sound can be entertaining and educational, but it's overly intolerant of mistakes—not for the faint of heart or the easily frustrated. **Sep 92**

★★★★ **Warlords, Strategic Studies Group, 904/494-9373, \$59.95.** A medieval fantasy world is the setting for this colorful game of strategy and conquest with beautiful graphics. Unfortunately, the computer opponents are not challenging enough for an experienced war-gamer, although human opponents may be. **Dec 92**

★★★★ **Wordtris, Spectrum HoloByte, 510/522-3584, \$49.95.** Tetris's falling blocks are letters in an arcade game for Scrabble lovers. Lots of variations, including modes for children, tournaments, and head-to-head play on a network, make it a super game. **Jun 92**

GRAPHICS

▣ **Adobe Illustrator 3.01, Adobe Systems, 415/961-4400, \$695.** Adept transformation and reshaping capabilities and superb text-handling stand out in this object-oriented illustration program. It also includes features found in no other Macintosh draw program, such as tools to create line and bar graphs.

▣ **Adobe Photoshop 2.0.1, Adobe Systems, 415/961-4400, \$895.** With complete mastery of the bitmapped, continuous-tone environment, this product is the industry standard for image manipulation. Although it's not perfect, it's so good that if you make your living in graphic art, it's worth the price of a Mac itself.

★★★★ **Aldus FreeHand 3.1, Aldus Corp., 206/628-2320, \$595.** A pressure-sensitive freehand tool is the most remarkable new feature of this updated drawing program. Substitution for missing fonts is another good addition, but skimpy text-editing tools and incomplete support for EPS continue to diminish its value. **Jun 92**

★★ **Aldus Gallery Effects 1.0 (1.5), Aldus Corp., 206/628-2320, \$199.** Uninspiring collection of 16 image-editing filters has an unusually strong manual. **Apr 92**

★★★★ **Alias 5ketch 1.0.2 (1.5), Alias Research, 800/447-2542, \$995.** The unique collection of tools makes this the only program that allows you to sit down and play with 3-D rendering. Failings include quirky navigation and sluggish performance. **Aug 92**

★★★★ **ArchiCAD 4.02 (4.1), Graphisoft USA, 415/737-8665, \$4450.** The simple yet powerful 3-D interface in this CAD package builds on a construction metaphor. The integrated product incorporates most of the features an architect needs. **Jun 92**

★★ **AutoCAD Release 11, Autodesk, 415/332-**

2344, \$3500. Customizable, bare-bones drafting upgrade partially implements a graphical user interface. Few add-ons are currently available. **Dec 92**

★★★★ **CA-CricketDraw III 1.0, Computer Associates International, 408/432-1727, \$249.**

Although not revolutionary, this draw program boasts some original implementations, including dramatically improved gradations. **May 92**

★★★★ **Cachet 1.0, Electronics for Imaging, 415/742-3400, \$595.** The tools, interface, output, and documentation of this color-image editor are all quite impressive for a first version, but serious failings include slowness and disappointing sharpening. **Dec 92**

▣ **Canvas 3.0 (3.0.6), Deneba Software, 305/596-5644, \$399.** Discovering the complex nuances of this draw program's immense feature list isn't easy, but it's well worth the effort. The precision drawing functions in particular should appeal to many users.

▣ **Claris CAD, Claris Corp., 408/727-8227, \$899.** Serious but basic CAD package has fallen behind the competition after a long period without an upgrade. Still, this is one of the fastest products available for scrolling and zooming—important for work on large, complex drawings.

★★★★ **Color It 2.0.1, Timeworks, 708/559-1300, \$299.95.** Overpriced color paint program has a full range of painting and image-retouching capabilities, including 15 levels of undo and an impressive magic wand tool, but its naming conventions are bewildering. **Apr 93**

★★★★ **DesignCAD 2D/3D 3.0.1, DesignCAD, 918/825-4848, \$299.95.** Despite slow rendering, this general-purpose 3-D modeler with 2-D drafting capabilities represents a price and performance breakthrough in 3-D modeling programs. **Nov 92**

★★★★ **ElectricImage Animation System 1.5.1, Electric Image, 818/577-1627, \$7495.** The most powerful animation program for the Mac improves its documentation and rendering, and adds an intuitive project window that allows you to control all aspects of animation from a single location. Unfortunately, it still retails for the price of a European vacation for two. **Feb 93**

★★★★ **Expert Color Paint 1.0, Expert Software, 305/567-9990, \$49.95.** A wonderful value for novices, this color paint program offers a tidy collection of features for an astonishingly low price. Beware of low memory settings, though, or it gets buggy. **Jun 92**

★★★★ **Fractal Design Painter 1.2, Fractal Design Corp., 408/688-8800, \$349.** An expanded collection of paper textures and four new watercolor brushes add appeal to an already strong set of painting tools. Minor complaints include unsophisticated gradation and fill capabilities and an insensitive Undo command. **Aug 92**

★★★★ **Infini-D 2.0, Specular International, 413/549-7600, \$995.** Rich combination of 3-D modeling, rendering, and animation tools at a relatively affordable price. Visualization program works well, offers a nicely integrated approach to rendering, and is generally stable. **Jan 93**

★★★★ **IntelliDraw 1.0, Aldus Corp., 206/628-2320, \$299.** Crowd-pleasing features such as physical and dynamic links make this automated draw program a great environment for planning and presenting, although it's less satisfying as a free-form drawing tool. **Nov 92**

▣ **MacDraw Pro 1.0v1 (1.5), Claris Corp., 408/727-8227, \$399.** The shallow array of integrated fea-

tures in this draw program is perfect for the new or moderately experienced user, but compared with other programs in the same price range, it's slow and deficient.

▣ **MacPaint 2.0, Claris Corp., 408/727-8227, \$125.** Easy-to-use black-and-white paint program takes up very little RAM, but it adds few capabilities beyond those it offered eight years ago.

▣ **MacRenderMan 1.0 (1.3), Pixar, 510/236-4000, \$695.** This dedicated renderer provides an extremely sophisticated, albeit sometimes difficult, way to generate 3-D images. Currently the most widespread rendering scheme, it uses algorithms to create textures, bumps, lights, fog, and practically every other element of an image.

★★★★ **MiniCAD+ 4, Graphsoft, 410/461-9488, \$795.** Professionals should be delighted with this highly competent CAD package's evolution into 3-D. It has maintained its features-champion status and is easier to use. **Mar 93**

★★★★ **Ray Dream Designer 2.02 (2.04), Ray Dream, 415/960-0765, \$895.** Experienced 3-D aficionados will find this 3-D-imaging software a welcome addition to their arsenal, and beginners may find it ideal for the leap from two dimensions to three. Improved text-handling and viewing capabilities would make it even better. **Sep 92**

★★★★ **ScanMatch 1.01 (1.02), Savitar, 415/243-3030, \$199.** Basically half a color-calibration system. Software quickly and easily adjusts color scan files for screen display, with somewhat uneven results; those wishing to adjust images for print purposes need to use another application. **May 92**

★★★★ **Showplace 1.1 (1.1.1), Pixar, 510/236-4000, \$695.** Straightforward graphics application organizes shading and rendering processes into five basic components. Beginners will like the simple interface, but the feature set is small for experienced users. **Jun 92**

★★★★ **Sketcher, Fractal Design, 408/688-8800, \$149.** A variety of effects reproduce the styles and techniques of traditional drawing tools with this wonderful gray-scale paint and image processing program. **Feb 93**

★★★★ **Smoothie 1.02, Peirce Software, 408/244-6554, \$149.** Create smoother screen images with this handy utility that antialiases the edges of on-screen artwork. Although it can't accommodate sound or accept imported QuickTime movies, it's a must for anyone who uses a Mac for presentations. **Nov 92**

★★ **StrataType 3d 1.0, Strata, 801/628-5218, \$295.** The rulers, texture palette, custom bevels, and canned positioning schemes of this 3-D type-effects software are nice, but they can't compare with the animation skills, single-character positioning features, lighting capabilities, and superb rendering of other available programs. **Mar 93**

▣ **Swivel 3D Professional 1.0 (2.0), Macromedia, 415/252-2000, \$695.** Relatively unusual cross-sectional technique makes this 3-D modeler a great tool, especially for fast prototyping. It provides a quick and easy way to create a variety of shapes.

★★★★ **Typestry 1.0, Pixar, 510/236-4000, \$299.** Type enters the third dimension with this reasonably priced 3-D typographic effects and animation program. There's room for improvement, but it's an exciting tool for designers, multimedia producers, and those who enjoy working with type. **Nov 92**

continues



Star Ratings

❑ **TypeStyler (2.0), Broderbund Software, 415/382-4400, \$219.95.** The 35 shapes of this product's library let you reshape PostScript or TrueType fonts to create decorative special effects such as arches and perspective. TypeStyler turns fonts into graphics, enabling you to stretch, compress, or rotate text, as well as add colors, grays, or patterns.

★★ **Zeus 0.91 (0.92), Delta Tao Software, 408/730-9336, \$499.** Color paint program tries hard to match capabilities found in more expensive programs, but not always successfully. It's brimming with good ideas that are poorly implemented. Aug 92

MATH/SCIENCE

★★★★ **Caduceus Physics 1.0, Scientia, 617/776-3427, \$159.95.** Giant HyperCard stack consists of carefully indexed cards covering small conceptual bites of physics; it's the first in a series of programs designed to prepare students for the Medical College Admissions Test (MCAT). Jan 93

❑ **Data Desk 3.0, Data Description, 607/257-1000, \$595.** Users with limited formal backgrounds in statistics can perform better analyses with this statistics program than with others.

★★★★ **Entrypaq 3.0, Albathion Software, 415/824-2737, \$149.95.** Low-end expert-systems shell is an excellent teaching tool, but the slow performance and HyperCard interface rule it out for practical implementation. Nov 92

★★★ **Expert Astronomer 1.0, Expert Software, 305/567-9990, \$49.95.** Draw maps of the sky from any location in the Solar System and learn about celestial objects with this astronomy software. Most effective in color, this is a great educational tool for beginners and a reference database for experts. Dec 92

★★★★ **Expressionist 3.0, Prescience Corp., 415/543-2252, \$199.95.** If you work regularly on similar topics, you can customize this equation-writing software so that it produces equations with exactly the appearance you want, letting you work at amazing speed. Mar 93

★★★★ **HiQ 1.0 (1.1), Bimillennium Corp., 408/866-2010, \$695.** A script language, which exhibits an endearing nonchalance about data structures and typing of variables, is only one of the impressive features of this formidable numerical mathematics software. Oct 92

★★★★ **Interactive Physics II 1.0 (1.01), Knowledge Revolution, 415/553-8153, \$399.** Motion simulation software is an improvement over traditional classroom instruction in physics. This new version greatly expands the range of problems that can be solved, and adds support for QuickTime. Dec 92

❑ **JMP 2.0 (2.05), SAS Institute, 919/677-8000, \$695.** You get lots of value for your money with this statistical-analysis program and its vast assortment of functions, including strong classical statistics and visualizations, 3-D spin features, quality-control statistics, and a manual that is a model of concise clarity.

★★★★ **MacBreadboard 1.1, Yoeric Software, 919/644-1620, \$59.95.** Useful educational engineering software simulates with excruciating detail every aspect of a digital integrated-circuit breadboard trainer. It accurately replicates and even surpasses the behavior of a physical breadboard—without burning out IC chips. Dec 92

★★★★ **Maple V, Brooks/Cole Publishing,**

800/354-9706, \$450. For functional scope and ease of use on a basic Mac (such as a Classic or Plus), this symbolic math software has no competitors. May 92

❑ **Mathematica 2.0 (2.1), Wolfram Research, 217/398-0700, \$595.** While its memory demands are high, this symbolic-math program offers a truly vast array of functions, including over 800 numerical and symbolic routines. The quality and quantity of its support literature are outstanding.

★★★★ **MathType 3.0, Design Science, 310/433-0685, \$199.** This equation-writing software makes automatic typographical decisions, which is helpful if you produce documents on a wide range of subjects. Its smooth integration with Microsoft Word is also convenient. Mar 93

★★★ **Minitab 8.2, Minitab, 814/238-3280, \$695.** These statistical-analysis tools are broad but not exhaustive. Still, they're easy to learn and easy to use, making Minitab an excellent teaching tool. The graphics and output are unfortunately typewriter-like. Jun 92

★★ **NueX 1.1 (1.3), Charles River Analytics, 617/491-3474, \$295.** Lightweight introduction to artificial neural networks and knowledge-based expert systems has some merit, but cannot be considered a serious production tool. Oct 92

★★★★ **Sequencher 2.0, Gene Codes Corp., 313/769-7249, \$2200.** While not implementing everything a DNA researcher could want, this software for manipulating DNA-sequence information does provide the things a researcher really needs. The single best feature is its raw speed. Dec 92

★★★ **SigmaPlot for the Macintosh 4.11, Jandel Scientific, 415/924-8640, \$495.** It's a short path from raw data to publishable graphs with this scientific graphing software. The Mac fundamentals need polish, but the program offers unique analytic capabilities. Jul 92

★★★ **Simulink 1.2, The MathWorks, 508/653-1415, \$3995.** If you hear the word *Bode-plot* several times a week at work, this math-simulation software is designed to make your life wonderful. Little glitches and a command-line orientation are drawbacks. Dec 92

★★★ **StatView 4.0m, Abacus Concepts, 510/540-1949, \$595.** A nice mix of statistical prowess and operating convenience distinguish this statistical-analysis and presentation software. The printing options are outstanding. Nov 92

★★★★ **TeMath 1.0, Brooks/Cole Publishing, 800/354-9706, \$39.95.** For roughly the price of a textbook, this mathematical-exploration software provides all the help a student needs to understand what's really happening in differential and integral calculus. Apr 92

ORGANIZATION/PRODUCTIVITY

★★ **ACT 1.0, Contact Software International, 214/919-9500, \$395.** While this contact manager has several laudable features, such as customizable contact views and an integrated word processor, learning how to use it is a frustrating experience. Feb 93

★★★ **Active Memory 2.0, ASD Software, 714/624-2594, \$199.** Personal organizer distinguishes itself by providing strong network support, although it may be overkill for a lone user. Aug 92

❑ **Address Book Plus, PowerUp Software, 415/345-5900, \$99.95.** What you see is what you get with this field-based address-book software that sorts, selects,

formats, and prints names and addresses in every conceivable way. The disadvantage is that the product is slow, especially with more than 200 addresses in a file.

★★★★ **Agent DA 2.0 (2.1.1), TeamBuilding Technologies, 514/278-3010, \$129.** Simple, flexible calendar/reminder program includes every obvious calendar function—easy navigation, extensive print options, adjustable displays, recurring events, and even a straightforward manual. Sep 92

★★★ **Amaze Daily Planners: Cathy, The Far Side, Word-A-Day (2.0/1993), Amaze, 206/820-7007, \$59.95.** A cartoon (or word) a day makes scheduling more fun with these icon-based calendar/daily planners, but the graphics take up a lot of hard drive space, and the programs must be running in order for alarms to sound. Sep 92

★★ **Connections 2.1, Concentrix Technology, 415/358-8600, \$199.** A wider range of scheduling features, new printing options, and improved networking capabilities don't change the fact that this HyperCard-based personal information manager is just too slow. Nov 92

★★★★ **DateBook 1.5.1, After Hours Software, 818/780-2220, \$125.** Personal time manager offers a flexible approach to event scheduling and to-do-list management. This upgrade adds new features and fixes bugs that plagued the first version. Feb 93

★★★ **DayMaker 1.01 (2.0), Pastel Development Corp., 212/941-7500, \$99.95.** In spite of a few rough edges and missed opportunities, this personal organizer is a versatile tool for creating to-do lists, prioritizing tasks, and maintaining a calendar with alarms. Apr 92

★★★ **Dynodex 3.0, Portfolio Software, 408/252-0420, \$89.95.** The speed and printing options of this field-based address book manager are still its strengths, but this upgrade adds welcome interface improvements, including automatic phone-number formatting. Apr 93

★★★ **EasyAlarms 2.0.3, Essential Software, 914/889-8365, \$99.** Complex, flexible calendar, reminder, and to-do list program includes scripting and sound recording among many other features. Nov 92

★★★★ **First Things First 2.0 (3.0), Visionary Software, 503/246-6200, \$69.95.** The nifty on-screen clock that floats serenely above your windows is the most appealing feature of this good but basic event-reminder utility. Apr 92

★★ **Hello, Atelier Systems, 619/453-4300, \$99.** Unusual combination of contact management and word processing in a compact package. This first release is hampered by several notable flaws, such as text documents that must be linked to a contact name. Jan 93

★★★★ **In Control 1.0 (1.1), Attain Corp., 617/776-1110, \$129.95.** Shrink an immense list down to a bare skeleton and expand it again using this to-do-list manager's clean interface and collapsible row-and-column format. May 92

★★★★ **Inspiration 4.0, Inspiration Software, 503/245-9011, \$295.** Watch your ideas evolve in a dynamic diagram mode and a text-based outline mode with this brainstorming tool. It works best as a vehicle for organizing and developing ideas. Feb 93

★★★ **Intouch 2.0.4, Advanced Software, 408/733-0745, \$99.95.** Free-form database is a fast and easy way to manage contact information. Program offers flexible data entry instead of automatic formatting. Although this version adds a handy reminder system, it falls short as a

calendar planner. Feb 93

★★★ **Nolo's Personal RecordKeeper 3.0, Nolo Press, 510/549-1976, \$34.96.** Hierarchically configured database organizes your personal affairs, including legal matters, financial records, insurance plans, family history, and more, but it is frustratingly inflexible. Jan 93

★★★ **Now Up-to-Date 1.0.1, Now Software, 503/274-2800, \$99.** The swift performance and logical structure of this network calendar program make it easy to use, but deficiencies, such as the lack of a to-do-list function, are frustrating. Oct 92

★★★★ **Spiral 1.0, Technology Works, 512/794-8533, \$129.** Designed specifically for taking and organizing notes, this product provides an excellent feature set, including tabs, bookmarks, and an option for automatically expanding abbreviations, but it's marred by some annoying errors in the editing and import/export processes. Mar 93

★★★ **TouchBase 2.0 (2.0.1), After Hours Software, 818/780-2220, \$125.** Entering data is quick and easy, and there are lots of useful printing options, but this personal information manager displays a few rough edges, such as not allowing you to copy the information in the Record Summary field. Aug 92

PRESENTATION TOOLS

★★★★ **Action 1.0, Macromedia, 415/252-2000, \$495.** Entry-level multimedia integration program offers, for its price, a rich selection of features, including an excellent variety of transitions as well as gradient and patterned backgrounds. It makes producing presentations with sound and motion surprisingly easy. Feb 93

★★★★ **Adobe Premiere 2.0 (2.0.1), Adobe Systems, 415/961-4400, \$495.** A dream command post for video professionals, this QuickTime movie-editing software produces stunning special effects with little effort. Only the program's appetite for memory, disk space, and computer horsepower prevent it from being the non-professional's dream as well. Jan 93

☐ **Aldus Persuasion 2.1 (2.12), Aldus Corp., 206/628-2320, \$495.** For slide presentations, this product provides an all-in-one studio where each element—outline entries, slides, notes, handouts, and charts—is dynamically linked to the others. It offers layered builds and automated templates, and has a proven track record.

★★★★ **Animation Clips 1.0, Media In Motion, 415/621-0707, \$99.** Spice up a presentation with an animated stapler, a jukebox that's a work of art, or any of 5B other customizable animations from these business-oriented packages. Marred only by some choppiness and a few lesser-quality animations. Jun 92

★★★★ **CameraMan 1.0 (1.1), Vision Software International, 408/748-8411, \$149.** If you need to record continuous screen operations, this screen recorder is the best deal around. It handles 32-bit QuickDraw, takes advantage of QuickTime's long list of compression and playback capabilities, and even uses custom frame sizes. Sep 92

★★★ **Cinematic 1.0, Vividus Corp., 415/494-2111, \$495.** Easy-to-use program merges animation, interactivity, and presentation features, but the image- and text-handling capabilities are less than stellar. Jul 92

★★★ **DiVA Video5hop 1.0, DiVA Corp., 617/**

491-4147, \$599. Instantaneous playback sets this graceful QuickTime editing software apart. Its simple beauty is slightly offset by a few rough edges, a lousy manual, and an occasionally clumsy interface. Jul 92

☐ **HyperCard 2.1, Claris Corp., 408/727-8227, \$199.** Ease of use has made this multimedia-authoring software a tool for the masses. Although color is awkwardly implemented, more add-on products have been developed for this than for any other multimedia program.

★★★ **MacroMind Director 3.1, Macromedia, 415/252-2000, \$1195.** This minor update to a powerful and versatile multimedia authoring tool adds 23 scripting commands, QuickTime importing and editing, and a utility that compiles movies into a faster playback format—but the whopping \$149 addition to the price makes it an upgrade most users can afford to miss. Feb 93

★★★ **Magic 1.0 (1.1), Macromedia, 415/252-2000, \$395.** Outstanding editing features make this multimedia-presentation software easy to master. Many of the features of more-complex programs are missing, but what it does, it does well. Aug 92

★★★★ **Microsoft PowerPoint 3.0, Microsoft, 206/882-8080, \$495.** This remarkable upgrade puts this presentation program ahead of the pack in terms of convenience and ease of use. Although the ready-made template collection is pretty paltry, the extensive system of master layers, reliable cross-platform compatibility, and strong on-screen presentation capabilities more than compensate. Feb 93

★★★ **Morph 1.0, Gryphon Software Corp., 619/454-6836, \$149.** With patience and practice, you can become a high-tech special-effects wizard using this image-melding movie utility that “melts” one image into another. While using it is simplicity itself, you can only morph still images, and the program suffers from some first-release glitches. Nov 92

★★ **Motion Works ProMotion 1.0 (1.02), Motion Works, 604/685-9975, \$395.** Inexpensive animation program consolidates a slew of tempting features, including flexible path tools and ambitious support for Apple events, but the capabilities are strung together with a weak and problem-ridden interface. Nov 92

★★★★ **Special Delivery 1.0, Interactive Media Corp., 415/948-0745, \$399.** While this entry-level multimedia package has all the tools you need to assemble interactive screen presentations that burst with motion and sound, it has a disorienting interface and lacks the polish and power of other similarly priced programs. Mar 93

PROGRAMMING

★★★ **Ed5cheme 3.4, Schemers, 305/776-7376, \$49.95.** This clear, elegant programming language is an excellent tool for learning good programming techniques, although it can't be used to create stand-alone applications. Nov 92

★★★★ **MetaDesign for the Macintosh 3.0, Meta Software Corp., 617/576-6920, \$250.** This diagramming tool for structured systems analysis offers easy ways to group and ungroup symbols in diagrams and to show relationships between symbols. It excels at austere, classic flowcharts but could use some flashier features, such as shaded backgrounds, for presentations. Mar 93

★★★★ **Object Master 1.0.2, ACI U5, 408/**

252-4444, \$395. Successful combination of the superior object-management facilities typically found in Smalltalk as well as a first-rate programmer's editor. Plus it works with the most popular languages: C, C++, and Pascal. Jan 93

★★★★ **Prograph 2.5, TG5 Systems, 902/455-4446, \$495.** Elegantly designed, object-oriented development environment simplifies Macintosh programming. The graphics-based program is conceptually more advanced than traditional object-oriented programming. Jun 92

★★★ **Serius Programmer 3.0, Serius Corp., 801/261-7900, \$395.** The graphical interface of this application-design environment provides nonprogrammers with tools for creating custom software, but the documentation lacks critical explanations. Jan 93

★★★★ **Think C 5.0, Symantec Corp., 408/253-9600, \$299.** Although not a radical improvement, this is a significant upgrade to an outstanding development tool. Beginners won't find the documentation helpful. Jul 92

★★★★★ **Think Pascal 4.0, Symantec Corp., 408/252-3570, \$249.** A remarkable achievement—a programming language and environment full-bodied enough for professional programmers while still inviting for neophytes. No weak points and dozens of strengths. Aug 92

★★★★ **UserLand Frontier 1.0 (2.0), UserLand Software, 415/369-6600, \$249.** A robust scripting language distinguishes this ground-breaking desktop programming tool that can automate desktop functions, repetitive data-managements tasks, and more. Scripts can only be used on computers with copies of the program. Jul 92

UTILITIES

☐ **After Dark 2.0, Berkeley Systems, 510/540-5536, \$49.95.** Turn your screen into an aquarium or a view of a night skyline with this whimsical screen saver that includes more than 30 different modules.

★★★ **ALSoft Power Utilities 1.0.1 (1.0.2), ALSoft, 713/353-4090, \$129.95.** Buying this set of seven utilities is more economical than purchasing the included disk optimizer and resource manager (DiskExpress II and MasterJuggler) separately, but the other five utilities are unimpressive. Aug 92

★★★★ **At Ease, Apple Computer, 408/996-1010, \$59.** Sweet, simple, secure substitute for the Finder displays a clean, attractive page full of oversize icons where a single click launches a program or document. To delete, rename, or move files, you have to return to the Finder. Mar 93

★★★ **AutoDoubler 1.0.7 (2.0), Salient Software, 415/321-5375, \$79.95.** Designed to operate transparently, this automatic file-compression utility is a practical solution for users short on disk space, but it's missing many of the features of dedicated file-compression utilities, and it provides only limited control over the process. Sep 92

★★★ **BetterWriters 1.0.1 (1.0.3), GDT Softworks, 604/291-9121, \$69.** Smart drivers teach your ImageWriter, StyleWriter, or DeskWriter laser printer tricks, letting it perform printing gymnastics such as inverting images and adding a variety of options for improving output. Minor incompatibilities with some common applications are inconvenient. Jul 92

★★★★ **Citadel with Shredder 1.0 (1.1),** *continues*



Star Ratings

Microcom, 919/490-1277, \$149.95. Simple, convenient set of system-security tools covers all the bases, including password protection, encryption, permanent erasure, and more. Jun 92

★★★★ **Conflict Catcher and Other Innovative Utilities 1.0, Casady & Greene, 408/484-9228, \$79.95.** Enable or disable your INITs and start-up items when you boot-up, with this INIT manager that comes with four other system-related utilities. Its ability to track down INIT-related problems makes it a worthwhile investment even if you already own another INIT manager. Mar 93

★★ **Crash Barrier 1.0.1 (1.1), Casady & Greene, 408/484-9228, \$79.95.** Control panel device is supposed to intervene during system crashes. It's a great idea but only works for certain types of crashes. Apr 92

☐ **DiskDoublers 3.7 (3.76), Salient Software, 415/321-5375, \$79.95.** With its impressive safety features, extremely tight compression, and respectable speed, this file-compression utility is a must-have for anyone who could use more hard drive space.

★★★★ **DiskFit Pro 1.0 (1.1), Dantz Development Corp., 510/849-0293, \$125.** Effective backup utility requires a time- and disk-consuming initial full backup, but subsequent incremental backups are simple and speedy. It does not support tape drives. Apr 92

★★★★ **Drive 7 2.3, Casa Blanca Works, 415/461-2227, \$79.95.** Universal hard drive updater and formatter has an attractive, uncluttered interface that's so easy to use it makes hard drive maintenance almost relaxing. Jan 93

★★★★ **easyPrint 1.0, 5F/O, 402/291-0113, \$29.95.** Nifty utility lets you switch printers without using the Chooser. It's a bargain for network users and those who frequently change output devices. Oct 92

☐ **Exposure Pro 1.0.2 (1.02), Baseline Publishing, 901/682-9676, \$139.95.** A floating palette in this screen-capture utility lets you edit your screen shots before you save them. It's a clever idea for those who don't own a paint program, but it creates only 72-dpi bitmaps.

★★★★ **Fastback Plus 2.6 (3.0), Fifth Generation Systems, 504/291-7221, \$189.** Even the most hardened shirker should be inspired to back up by the marvelously simple interface of this software. One warning—memory shortages can cause it to quit unexpectedly when running in the background. Apr 92

★★★★ **FolderBolt 1.02 (1.02c), Kent Marsh, 713/522-5625, \$129.95.** Three designated levels of folder protection, plus flexible options for password-handling, among other actions, are the assets of this utility. File encryption, however, is not included. Jun 92

★★ **Gofer 2.0, Microlytics, 716/248-9150, \$79.95.** Poky processing time is the trade-off for flexible text-search options without indexing by this file-finding utility. Our reviewer vetoed the trade. Jun 92

★★★★ **HAM 1.0, Microseeds Publishing, 203/435-4995, \$79.95.** Apple-menu enhancer adds submenus, allows reordering, and includes a folder of recently opened items in your Apple menu. Apr 92

★★★★ **Hard Disk ToolKit Personal Edition 1.1.2, FWB Software, 415/474-8055, \$79.** The more arcane features of the heavy-duty Hard Disk ToolKit have been stripped out of this entry-level, non-power-user version, but everything you really need to format, update,

partition, and manage your hard drive is still included. Jan 93

★★★★ **INITPicker 3.0, Inline Design, 203/435-4995, \$79.95.** This INIT manager's ability to load aliased INITs over a network will interest network managers. While it disables problem INITs at start-up, it doesn't help you identify the cause of INIT conflicts that don't cause the Mac to crash at start-up. Mar 93

★★★★ **Inline Sync 1.0, Inline Design, 203/435-4995, \$129.95.** Keep the latest version of your work on both your portable machine and your desktop Mac with this file-synchronization software. It's easy to install, easy to use, easy on the wallet, and does the job well. Mar 93

★★★★ **Kiwi Power Menus 1.0, Kiwi Software, 805/685-4031, \$39.95.** Simple little utility adds flexibility to the Apple menu by adding an unlimited number of submenus and enabling you to change the font and size in the menus. Dec 92

★★★★ **Kiwi Power Windows 1.5 (1.5.2), Kiwi Software, 805/685-4031, \$79.95.** Our skeptical reviewer found this system extension surprisingly handy. Its hierarchical menu lists all the open windows in the Finder and any applications. Jul 92

★★★★ **MacPalette II 2.2, Microspot USA, 408/253-2000, \$69.** You can print images from 8-bit and 24-bit color programs when you use an ImageWriter II with a four-color ribbon and this new driver that approximates halftones by dithering. While the results are less than state-of-the-art, so is the cost. Sep 92

★★★★ **MacTools 2.0, Central Point Software, 503/690-8090, \$149.** The consistent, 3-D-style interface makes it easy for the inexperienced user to navigate this utility package; the automated hard drive and floppy-disk repair capabilities and antivirus capabilities make it an asset for anyone. Oct 92

★★★★ **Magnet 1.0, No Hands Software, 415/321-7340, \$129.95.** Automation aids the laborious task of file management with this software. It creates "agents" or "magnets" that trigger in response to user-specified events and automatically look for files and folders to copy, move, or alias. Feb 93

★★★★ **MasterFinder 1.2.1, Olduvai Corp., 305/670-1112, \$149.** Ingenious finder utility provides rapid access to frequently used files and folders, permits operations on several files at once, and saves catalogs of offline volumes, but the many features require some effort to learn. Nov 92

★★★★ **More Disk Space 1.1 (1.2), Alysis Software Corp., 415/566-2263, \$39.95.** Automatically compress and expand files with this utility. Although it doesn't identify compressed files, and must run as a start-up application to work automatically, it does offer a measure of control that similar utilities lack. Sep 92

★★★★ **NightWatch II 2.0.1b, Kent Marsh, 713/522-5625, \$159.95.** Although skillful snoops can override the screen-locker feature of this hard drive security utility, the password protection provides a flexible and safe method of restricting access to anyone turning on your hard drive. Nov 92

★★★★ **Nok Nok 1.0 (1.0.3), Trik, 617/933-8810, \$49.95.** Plug the security holes that System 7 file sharing created, with this effective file-share monitoring utility that logs people's attempts to connect to your Mac, alerts you when someone does connect, and sets time limits for

file share users. Oct 92

★★★★ **Norton Utilities for Macintosh 2.0, Symantec Corp., 310/453-4600, \$149.** Everything—including-the-kitchen-sink utility package does an excellent job of diagnosing and repairing damaged hard drives and floppy disks, but the interfaces of the various components differ wildly. Oct 92

☐ **Now Utilities 3.0.2 (4.0.1), Now Software, 503/274-2800, \$149.** Despite minor imperfections, this collection of utilities, including ten separate programs and a variety of sample and support files, provides lots of highly polished bang for your buck.

★★★★ **On Location 2.0.1, On Technology, 617/876-0900, \$129.95.** Fast file-finding utility with improved functionality shows formatted files, and updates index in background. Alas, the initial indexing is time-consuming, and the search functions are incomplete. Jun 92

★★★★ **PicturePress 2.5, Storm Technology, 415/691-6600, \$199.** This image-compression software supports every useful storage mode; has new calculation features for improved image fidelity; offers utilities with practical advantages for day-to-day graphics work; and is twice as fast as version 2.0. If you work with images professionally, it's the clear choice. Mar 93

★★★★ **Retrieve It 1.0, MVP Software, 415/599-2704, \$129.** It's great that this nonindexed file-finding utility allows you to search by file name as well as by text, but it is definitely slower than indexed searching. Nov 92

★★★★ **Shredder 1.0.1, DLM Software, 619/453-4984, \$69.** Permanently blitz your data with this quick and easy trash-management tool that writes over deleted data—in accordance with Department of Defense specifications—so that file-restoration programs can't bring it back. Jul 92

★★★★ **Silverlining 5.4, La Cie, 800/999-3919, \$149.** Extensive and detailed testing is only one of many advanced functions offered by this hard drive—management utility. The interface is lackluster and apt to confuse beginners. Jan 93

★★★★ **SnapBack 1.0, Golden Triangle Computers, 619/279-2100, \$129.** For regular day-to-day backups, this network backup software is a great choice. Its strength lies in its simplicity and its easy-to-use, one-window interface, but it requires a dedicated hard drive. Dec 92

★★★★ **SpeedyCD 1.2.2 (1.2.4), ShirtPocket Software, 602/966-7667, \$70.** Get Info gets faster with this CD ROM—access accelerator that creates a database of files from a CD and puts it on your hard drive. If you regularly browse through the same CD ROM folders, this product might save you enough time for it to be worth the \$70. Nov 92

★★ **SuperDuper 1.7, NeoConcepts, 408/899-4821, \$79.** If you're sick of duplicating disks with the Finder, this utility is an acceptable alternative, but there are other utilities that are better, cheaper, and do the same thing. Nov 92

☐ **Symantec Antivirus for the Mac (5AM) (3.0.9), Symantec, 408/253-9600, \$99.** No-holds-barred virus fighter monitors your Mac and alerts you when it sees suspicious activity. Advanced users and network managers will appreciate its customization features and extensive scanning options.

★★★★ **TimeLog 1.01 (1.02), Coral Research,**

702/831-9346, \$97. Even jaded computer users will approve of the reporting options offered by this utility for recording program-usage information. No network features included. Jul 92

★★★★ **UpDiff 1.0, KyZen Corp., 609/354-3863, \$169.** Innovative program compares two versions of a file, extracts the differences, and creates a difference file that is typically smaller than the original and can be used to update the older file. Dec 92

★★★★ **Voice Navigator SW 2.3, Articulate Systems, 617/935-5656, \$399.** Talk back to your Mac (if it has built-in sound input) with this speech-recognition software. Defining macros that respond to voice commands can be frustrating, but the product is a real boon for disabled users. Jan 93

★★★★ **Wallpaper 1.0.1 (1.0.2), Thought I Could, 212/673-9724, \$59.99.** Terrific control panel device lets you design, edit, import, and display repeating patterns on your Mac's desktop. Comes with fun, creative predesigned patterns. May 92

★★★★ **WindoWatch 1.52 (1.53), ASD Software, 714/624-2594, \$149.** If your main concern is to track program and file use, this utility will handle the job nicely. Using it for time billing with numerous programs, however, may be a maintenance nightmare. Jul 92

★★★★ **WonderPrint 1.0, Delta Tao Software, 408/730-9336, \$59.** StyleWriters and DeskWriters produce halftones good enough for newsletters with this printing extension that improves the output of QuickDraw printers and accelerates printing of pictures on PostScript printers. Jan 93

★★ **Workspace 1.0, Ark Interface, 206/654-4127, \$149.** Although this novel desktop replacement is an intriguing first step toward improving the Finder, not enough functionality was added to satisfy our reviewer. Jul 92

★★★★ **Zephyr Palettes for PageMaker, Zephyr Palettes for FreeHand 1.0.2 (1.3), Zephyr Design, 206/324-0292, \$79.95.** Exchange pull-down menus for palettes in PageMaker or FreeHand with these cleverly conceived, modestly priced utilities. A number of details could still be smoothed, but none are real stumbling blocks. Jul 92

VERTICAL MARKETS

★★ **ConstructionMac 1.2 (2.0), Revelar Software, 801/485-3291, \$99.** With a lot of work from you, this software will organize your construction or remodeling project. Oct 92

★★ **The Desktop Lawyer, The Open University, 407/649-8488, \$99.95.** The manual included with this collection of more than 300 legal-document templates provides an excellent overview of legal concepts; too bad the directions for filling out the forms are so unclear. Apr 92

★★★★ **Diet Balancer 1.0, Nutridata Software Corp., 914/298-1308, \$69.95.** Easy-to-use personalized weight-planning tool includes a database of nutritional values and standard serving sizes, and is useful for home diet-planning. Dec 92

★★ **Expert Landscape Design, Expert Software, 305/567-9990, \$49.95.** Bare-bones drawing environment for experimenting with landscape design is inexpensive, but its usefulness is severely limited because

of awkward color and pattern tools and because it doesn't identify plant types. Feb 93

★★★★ **Grade Machine 5.0, Misty City Software, 800/795-0049, \$79.** Teachers' lives get easier with this software that quickly sets up a useful electronic grade book. Program includes networking capabilities plus dozens of options for printing reports. Dec 92

★★★★ **JobTracker 2.02, InfoSolutions, 814/355-2983, \$395 to \$844.** Designed specifically for publication management, this scheduling and project-management software isn't completely polished, but it manages the job competently. Dec 92

★★★★ **Legal LetterWorks 1.0, Round Lake Publishing, 203/438-1048, \$79.95.** Any word processor can open the 165 legal-document templates included in this collection, and the modular form design is relatively versatile. Apr 92

★★★★ **Making the Grade 2.0, Jay Klein Productions, 719/591-9815, \$99.95.** The Macintosh version of the Apple II program Grade Busters 1/2/3, this grade-book software with dozens of reporting options is easy to learn; but if you're already spreadsheet-literate, the friendly dialog boxes and reminders may get in the way. Dec 92

★★★★ **Nolo's Living Trust 1.0, Nolo Press, 510/549-1976, \$79.95.** Gracefully guiding users through the process of drafting a living trust, this product is carefully thought out and a great value for simple trusts. Aug 92

★★★★ **Nutri-Calc Plus 1.2, Camde Corp., 602/926-2632, \$225.** Designed for knowledgeable and serious users, this powerful, flexible program manages nutrition information and analyzes diets. Dec 92

★★★★ **Stat-Ref 3.2a, Teton Data Systems, 307/733-9258, \$95.** Medical database on CD ROM lets you search by keyword. Because it provides access to limited sets of journal citations, it's not suitable for research, but it could effectively replace a small reference library in an office. Jan 93

WRITING TOOLS

★★ **Correct Grammar 3.0 (3.01), Wordstar International, 415/382-8000, \$99.** Illogical and inappropriate recommendations are a hallmark of all grammar checkers, but this one also violates Mac conventions in irritating ways. Aug 92

★★★★ **Correct Letters 1.1 (1.0), Wordstar International, 415/382-8000, \$49.** In addition to more than 250 ready-made business letters, this HyperCard-based product boasts an excellent online Guide to Letter Writing. The disabled Find command is mystifying and inconvenient. Jul 92

★★ **Correct Writing 2.0, Wordstar International, 415/382-8000, \$49.** For those who are unsure of the elements of style, this online reference is convenient and comparatively inexpensive, but it is far from complete. Sep 92

★★★★ **DocuComp II 1.0 (1.03), Advanced Software, 408/733-0745, \$179.95.** Document-management utility compares text in two versions of the same file and reports the differences in a comprehensive, easy-to-follow format. Nov 92

★★★★ **EndNote Plus 1.2 (1.2.1), Niles and Associates, 510/649-8176, \$249.** Reference data-

base and tool for creating citations and bibliographies is accessible from Microsoft Word 5.0, representing a significant enhancement to this excellent product. Sep 92

★★★★ **IdeaFisher 2.0, Fisher Idea Systems, 714/474-8111, \$595.** Inspiration never comes easily, but this creativity tool with a question bank of 6000 questions and an idea bank of 61,000 words and 700,000 links might help get the juices flowing. Jan 93

★★★★ **LetterPerfect for Macintosh 2.1, WordPerfect Corp., 801/225-5000, \$149.** Stripped-down version of WordPerfect measures up as a serviceable low-end word processor, with clean, accurate documentation and an uncluttered interface. Jan 93

★★★★ **Microsoft Word 5.1, Microsoft, 206/882-8080, \$495.** Small, solid upgrade fine-tunes some plug-in modules and adds new modules including an icon tool bar, text annotation, and other features. The numerous minor enhancements make it worth the upgrade price, but it won't give Word 5.0 users goosebumps. Mar 93

★★ **Nisus Compact 3.3 (3.31), Nisus Software, 619/481-1477, \$150.** Inexpensive price and low disk-space requirements don't compensate for this word processor's many missing features, including mail merge, macros, and word count. Memory quirks are an additional problem. Aug 92

★★★★ **Plots Unlimited 1.04, Ashleywilde, 310/456-1277, \$399.** Peter loves Allison but she has a breakdown when he confesses to murder. Or maybe not. This writing tool's database contains 5600 plot twists, all linked. The interface is imperfect, leaving items in bold when they should be grayed out, and it requires too much mousing. Jul 92

★★★★ **Pro-Cite 2.0, Personal Bibliographic Software, 313/996-1580, \$395.** Valuable bibliographic database program generates large, complex bibliographies. Some features aren't easy to use, but it does have 20 predefined and 6 user-defined forms, plus flexible sorting options. Jun 92

★ **StoryLine 1.02 (1.4), Truby's Writers Studio, 310/575-3050, \$345.** Frustrating and sometimes haphazard HyperCard-based program attempts to offer expert training in the craft of plot development. Aug 92

★★ **Taste 1.02 (1.02c), DeltaPoint, 408/648-4000, \$149.** The page-view, WYSIWYG orientation of this word processor with page-layout features makes it considerably slower than text-oriented word processors. Redraw and translator bugs are other problems. May 92

★★★★ **Thunder 7 1.0.5 (1.5), Baseline Publishing, 901/682-9676, \$99.95.** The speed, customizing options, and overall feature-set of this stand-alone spelling checker and thesaurus are admirable, but before you can trust it implicitly, it needs a dictionary with greater integrity. Jul 92

★★★★ **TypeReader 1.0, ExperVision, 408/428-9988, \$695.** Speed and accuracy combine with a straightforward operating style in this high-end optical character-recognition software that doesn't do everything its competition does, but is a major contender nonetheless. Feb 93

★★★★ **WordPerfect for Macintosh 2.1 (2.1.2), WordPerfect Corp., 801/225-5000, \$495.** Play QuickTime movies in your text files or publish and subscribe with this upgrade. It continues to provide the best desktop publishing and graphics capabilities of any word processor, but it lacks glossary- and table-creation features. Jun 92

continues



Star Ratings

★★★ **WordScan, WordScan Plus 1.0 (1.01), Calera Recognition Systems, 408/720-8300, \$295, \$595.** The idiosyncratic interface of these two OCR programs is only a minor inconvenience considering their relative accuracy and speed. Jun 92

★★★★ **WriteNow 3.0, T/Maker Company, 415/962-0195, \$249.** The streamlined approach of this low-end word processor will appeal to many Macintosh users, especially the storage-conscious. A nice mix of features includes impressive implementation of style sheets. Sep 92

Hardware

INPUT DEVICES

★★★★ **A³ Mouse, Mouse Systems Corp., 510/656-1117, \$134.95.** A smooth ride and tight resolution characterize this optical device with three light-touch keys. Stronger software would have made it a more attractive package; the software's incompatibilities and limitations are a problem. Jun 92

★★★★ **Acecat for Macintosh, AceCAD, 408/655-1900, \$149.** It's the hands-down winner in the digitizing-tablet price competition, but although this product works well, it lacks some of the amenities of higher-end tablets. Aug 92

★★★★ **The Bat, Infogrip, 504/766-8082, \$495.** Right- and left-hand keypads slant the little fingers down and the thumbs up, with built-in wrist rests. Our reviewer considered it the best ergonomic device she'd seen; the downside is learning to type all over again. Oct 92

★★★★ **DrawingBoard II, Drawing Pad, CalComp, 800/932-1212, \$645, \$395.** Two likable features of these digitizing tablets are the transparent, hinged cover for securing artwork, and a menu strip with buttons for changing drawing modes and accessing macros. Stylus problems and CalComp's haphazard tech support are drawbacks. Jul 92

★★★★ **Mouse-Trak, Itac Systems, 214/494-3073, \$179.** Well-positioned, easy-to-rotate trackball with a soft wrist-pad is comfortable to use, but must be disassembled to reconfigure the buttons. Nov 92

★★★★ **MouseMan, Logitech, 510/795-8500, \$129.** Bear-paw-shape mouse with three programmable buttons is handsome and solidly made. It may be too big for some hands. Jun 92

★★★★ **TrackMan, Logitech, 510/795-8500, \$149.** There's a right-hand bias to this trackball with three programmable buttons and a handy click-lock feature. Jun 92

★★★★ **Turbo Mouse 4.0, Kensington Microware, 415/572-2700, \$169.95.** The large buttons on either side of this trackball provide just the right measure of tactile feedback while the removable ball glides freely. The breakthrough feature, though, is the software that lets you customize many of the trackball's functions. Nov 92

★★★★ **Voice Express, MacSema, 503/757-1520, \$399.** Voice-recognition board allows you to record words or phrases that trigger simple key sequences, but unfortunately, commands are limited to those with keyboard equivalents, and the system is weighed down by several quirky features. Apr 92

★★★★ **Voice Navigator II, Articulate Systems, 617/935-5656, \$699.** Stand-alone SCSI device offers an impressive, full-featured set of tools for voice control of your Mac, but mastering them takes time and effort. Apr 92

★★★★ **Z-Nix Cordless SuperMouse, Z-Nix, 714/629-8050, \$99.** Sleek and attractive cordless mouse works reliably and is attractively priced, but suffers from the same line-of-sight limitations as other infrared devices (such as TV remote controls). Dec 92

MISCELLANEOUS HARDWARE

★★★★ **AC5300 Computer Speaker System, Altec Lansing Consumer Products, 717/296-4434, \$400.** Clamshell-shape high/midrange speakers come with a freestanding subwoofer and power supply. The sound is rich and smooth, but the cabling is nonstandard, and there is no on/off switch. Nov 92

★★★★ **Bose RoomMate speakers, Bose Corp., 508/879-7330, \$329.** Shielded stereo speakers with a rich, bassy sound can double as regular stereo speakers. Unfortunately, they're heavy, expensive, and the highs are muddy. Jun 92

★★★★ **Mac5peaker M5-1, Monster Cable, 415/871-6000, \$229.95.** Crystal-clear highs and a meaty midrange are the best features of these shielded stereo speakers. They're beautifully designed for close-up listening, but the bass sounds wimpy. Jun 92

★★★★ **Media Control Station, JLCoeper Electronics, 310/306-4131, \$269.95.** This versatile tool connects to the Mac through an ADB port and offers an easy and intuitive way to cue and edit QuickTime movies, MIDI files, multimedia playlists, and other dynamic data. Feb 93

★★★★ **The Miracle Piano Teaching System 1.0, Software Toolworks, 415/883-3000, \$499.95.** Painstakingly crafted music and piano instructor comes with keyboard, software, and 120 songs, including classical, movie-theme, and rock. The program offers encouragement and advice, and ends every lesson with a synthesized orchestra accompaniment. Oct 92

★★★★ **The Mouse Yoke, Colorado Spectrum, 303/225-6929, \$34.95.** Gadget turns an ordinary mechanical mouse into an aircraft-style steering wheel, or yoke, for use with flight simulators. Simple, elegantly executed concept uses quality materials; device is not appropriate for driving simulations or shooting games. Dec 92

★★★★ **Organizer Link II (Model OZ-893), Sharp Corp., 800/321-8877, \$129.99.** If you own a 5000-, 7000-, or 8000- series Sharp Wizard, this program and cable allow you to connect it to a Mac serial port to exchange data. It's functional, but does have some minor weaknesses. Jan 93

★★★★ **PhonePro 1.0.3 (1.1), Cypress Research Corp., 408/752-2700, \$950.** Application makes it relatively easy to develop a multiple-choice voice-mail system using your Mac, especially for those with programming backgrounds. The product includes a 9600-bps modem and a headset/microphone. Feb 93

★★★★ **PowerKey 2.0, Sophisticated Circuits, 206/485-7979, \$119.** Ingenious, well-designed automated power strip has four surge-protected outlets that are controlled by the keyboard's on/off switch. The equally clever software can turn on your Mac, unattended, run a Quic-

Keys macro (QuickKeys Lite included), and shut down again. Dec 92

★★★★ **Ringo LM, MacSema, 503/757-1520, \$189.95.** If your sole phone-line is doing double duty as a fax and voice line, this telephone-line manager is the answer to your prayers. May 92

MODEMS / NETWORK HARDWARE

★★★★ **Comstation 2, PSI Integration, 408/559-8544, \$399.** Unusually well designed software accompanies this fax/data modem. The simple, straightforward interface and handy QuickFax DA are positives; uninformative error messages are minor negatives. Jun 92

★★★★ **Comstation 4, PSI Integration, 408/559-8544, \$499.** An otherwise solid fax/data modem for network use is hurt by an awkward process for distributing faxes, plus the need for a separate file server and fax server. Jun 92

★★ **EtherPrint, Dayna Communications, 801/531-0600, \$499.** It's possible to connect a single LocalTalk printer to an Ethernet network using this device, but it's an expensive option. Dec 92

★★★★ **EtherPrint Plus, Dayna Communications, 801/531-0600, \$649.** Support four LocalTalk products on an Ethernet network using this device that can also serve as an inexpensive AppleTalk router. Dec 92

★★★★ **EtherWrite, Compatible Systems Corp., 303/444-9532, \$695.** Elegant and cost-effective device with excellent network-management software allows up to six LocalTalk products to connect to an Ethernet network. Dec 92

★★★★ **PathFinder, Dayna Communications, 801/531-0600, \$899.** For simple networks, this LocalTalk-to-Ethernet router is a great value, as well as a great time-saver for beginning network managers. It uses AppleTalk only. Jan 93

★★★★ **PowerModem, PSI Integration, 408/559-8544, \$299.** Superior fax software distinguishes this fax/data modem for PowerBooks, but it's not the best choice for those who do a lot of online work that requires a high-speed data modem. Jul 92

★★★★ **PowerPort/Gold, Global Village Communications, 415/329-0700, \$499.** If you need 14,400-bps throughput, this data/fax modem is a champ. Its improved software and packaging raise the standards for PowerBook modems. Dec 92

★★★★ **QBlazer, Telebit Corp., 408/734-4333, \$599.** If portability is an important issue, this 9600-bps modem's pint size and battery power make it an attractive choice; otherwise, its high price plus the lack of Mac software and send-fax features work against it. May 92

★★★★ **QuickTel Xeba 9600, Logicode Technology, 805/499-4443, \$319.** Sleek, slanty, futuristic-looking fax modem offers all the features you'd expect, including acceptable fax software. Apr 92

★★★★ **Sportster 14,400 Fax/Data Modem, U.S. Robotics, 708/982-5001, \$599.** Several nice features, including an easily accessible power button and a front-mounted volume-control dial, make this 100 percent Mac-ready, 14,400-bps fax/data modem better than average. Feb 93

★★★★ **SupraFaxModem V.32bis, Supra Corp., 503/967-2400, \$399.95.** Send and receive *continues*



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MACWORLD

Star Ratings

faxes and data at speeds up to 14,400 bps with this attractively priced fax/data modem. The software works well; tech support is adequate. **Aug 92**

★★ **Ultima Home Office, Prometheus Products, 503/692-9600, \$649.** When it can reliably transmit data at high speeds and the voice bugs are fixed, this fax modem with voice mail will be worth a second look. **Oct 92**

★★ **Viva 14.4/Fax, Computer Peripherals, 805/499-5751, \$469.** In data mode, this 14,400-bps fax/data modem performed well, but the software bundled with it is barely adequate. **Jan 93**

★★ **WorldPort 9600 MNP5, U.S. Robotics, 708/982-5001, \$475.** Only slightly larger than a deck of cards, this 9600-bps modem is geared toward PC users, with a user guide that never mentions Macs and software that is only for PC compatibles. **Jan 93**

PRINTERS

★★ **C. Itoh ProWriter Printer, C-Tech Electronics, 714/833-1165, \$2395.** Not only is this laser printer more expensive than most personal page printers, it also offers less-impressive features and so-so output. **Nov 92**

★★★★ **HP LaserJet 4M, Hewlett-Packard, 800/752-0900, \$2999.** An Intel i8960 RISC processor makes printing complex images faster than ever with this 600-dpi printer, while the Canon LBP-EX print engine and microfine toner guarantee smooth curves and crisp characters. An autoswitch feature makes it a flexible option for mixed-platform offices. **Feb 93**

★★★ **HP PaintJet XL300, Hewlett-Packard, 800/752-0900, \$3495.** The output of this color ink-jet printer won't satisfy demanding graphic arts professionals, but it's great for business users interested in punching up their presentations. **Oct 92**

★★★★ **IBM LaserPrinter 10A, IBM Corp., 800/358-5835, \$3995.** Beautifully defined text, razor-sharp line art, clear gray tones—the output from this large, awkwardly designed, 600-dpi PostScript printer is dazzling, and all for under \$4000. **Aug 92**

★★★★ **LZR 1560, Dataproducts Corp., 818/887-8000, \$3395.** Tabloid-size 400-dpi laser printer blazed through our standard printer speed tests and produced output noticeably better than that of 300-dpi printers. It's a good choice for a mixed network. **Sep 92**

★★★★ **LZR 960, Dataproducts Corp., 818/887-8000, \$2195.** This peach of a personal PostScript printer is compact, fast, and produces excellent output. Our reviewer experienced low-memory error messages, but most memory problems should be solved with the current shipping configuration of 3MB of RAM. **Jul 92**

★★★★ **RasterOps CorrectPrint 300, RasterOps Corp., 408/562-4200, \$8999.** The cost of high-quality, photo-realistic color printing takes a nosedive with this 300-dpi, dye-sublimation printer. The relatively small (8.1 by 8.6 inches on letter-size media) print area is the only significant flaw. **Oct 92**

★★★★ **RealTech Laser 400, Hardware That Fits, 409/760-2400, \$3195.** Exactly the same tabloid-size, 400-dpi printer as the Dataproducts LZR 1560, but for slightly less money. And it produces output that is perceptibly better than that of 300-dpi printers. **Sep 92**

★★★★ **StyleWriter, Apple Computer, 408/**

996-1010, \$399. If money is tight, if you want nice-looking output, and if you have a little extra time to spare, this is a good personal printer with a new driver that makes it even better. **Sep 92**

★★★★ **TI microLaser Turbo, Texas Instruments, 800/527-3500, \$2349.** An enhanced version of TI's microLaser Plus, this PostScript Level 2 printer is an admirable performer and a dependable machine, but it leaves you wondering whether the extra \$500 is worth it. **Jul 92**

★★★★ **WideWriter, GCC Technologies, 617/890-0880, \$1699.** Large-format output comes in a reasonably priced package with this ink-jet printer that can automatically feed sheets as large as 14 by 91 inches or manually feed sheets 17 inches wide with an unlimited length. **Feb 93**

SCANNERS

★★★★ **HP ScanJet IIP, Hewlett-Packard, 800/752-0900, \$1095.** An elegant piece of technology, this desktop gray-scale scanner produces excellent results for a street price of around \$750. Muddled online help and a flimsy hinge are minor problems. **Aug 92**

★★★★ **LightningScan Pro 256, Thunderware, 510/254-6581, \$649.** A well-executed hand-held gray-scale scanner worth the cost. It creates 8-bit scans at up to 400 dpi; images scanned in two passes can be joined flawlessly. The only drawback is slow scrolling in software. **Jun 92**

★★★★ **Mirror 600 Color Scanner, Mirror Technologies, 612/633-4450, \$1199.** Three-pass scanner with 600-dpi vertical and 300-dpi horizontal resolution is fast, precise, and an excellent value. The only liability is its somewhat quirky software. **Apr 92**

★★★★ **Nikon LS-3510AF Film Scanner, Nikon, 516/547-4355, 8-bit \$9535, 24-bit \$11,316.** The bread-box-style design of this 35mm film scanner may be reminiscent of past models, but many changes make it faster and more convenient. Still, advanced users won't be satisfied with the tools for overriding automatic exposure and tone adjustments. **Sep 92**

★★ **PageBrush Professional, Mitsubishi International, 415/544-2781, \$795.** A brilliant idea with unfortunate rough spots. Gray-scale, hand-held scanner/mouse scans full-page or larger images and produces 300-dpi gray-scale files, but the process and software are agonizingly slow; the buttons are hypersensitive; and the product is expensive. **Jun 92**

★★★ **RasterOps Espresso Personal Slide Scanner, RasterOps Corp., 408/562-4200, \$849.** Essentially a video camera mounted above an illuminated stage, this slide scanner outputs NTSC video. It's fast, convenient, and economical, but falls short for digital images; its best file looks worse than output from a 24-bit flatbed or slide scanner. **Apr 92**

SYSTEMS/STORAGE

★★★★ **Duo Dock, Apple Computer, 408/996-1010, \$1079.** Immensely clever desktop-Mac-size housing for the Duo laptops provides back-panel connectors, a SuperDrive, electrical and physical support for external monitors, and two expansion slots. Although the Duo Dock is easy to like, some details, such as the difficulty of

continues

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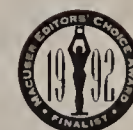
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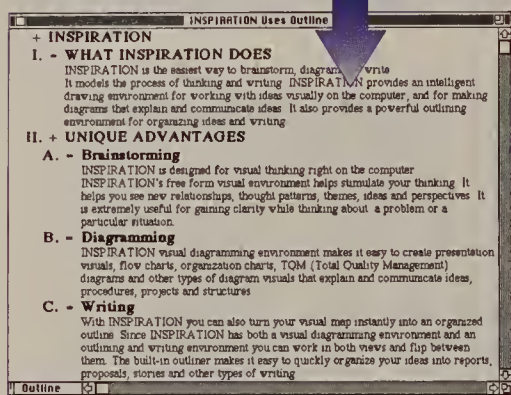
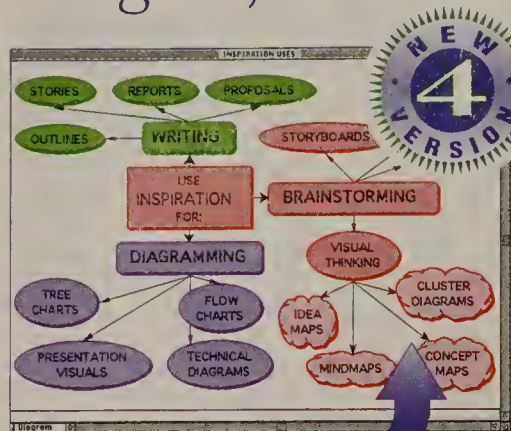
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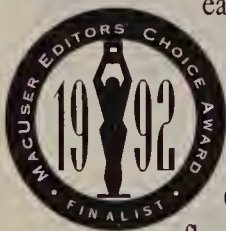


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installing NuBus boards, belie Apple's usual attention to detail.
Mar 93

★★★★ **Floptika 20/M, Procom Technology, 714/852-1000, \$585.** It is easy to recommend this floptical drive due to its speed, relatively low cost, bundled software, and lack of problems. Although it allows invalid SCSI ID addresses, it's a fine product. Sep 92

★★★★ **Freedom 120, Maxen, 619/944-0818, \$699.** Battery-powered hard drive provides three to four hours of hard drive storage without a power cable; it performs at a respectable speed, but lacks a battery-power gauge and automatic sleep mode. The skimpy manual is the most serious problem. Sep 92

★★★★ **Infinity Floptical 21MB, Peripheral Land, 510/657-2211, \$599.** The good points of this floptical drive include extensive documentation, switchable termination, and an autoeject function, but the bad points are the odd size, the incompatibility of the bundled software with System 7, and inappropriate formatting of 800K disks. Sep 92

★★★★ **Outbound Notebook System 2030S, Outbound Systems, 303/786-9200, 4/40 \$2799, 8/80 \$3299, 14/120 \$3999.** If raw power is what you're looking for in a notebook computer, this is the hands-down choice. It's lightweight, upgradable, and performs at a level between a IIci and a IIx, but the screen is only adequate. Sep 92

★★ **Performance/040 (33MHz), Impulse Technology, 404/889-8294, \$2399.** For disk-intensive tasks, this 68040 33MHz accelerator board tested slower than the native CPU and, in general, was slower than comparable accelerator boards. It is compatible with all Mac II's. Oct 92

★★★★ **PLI MiniArray 850MB, PLI MiniArray 2G8, Peripheral Land, 510/657-2211, \$6999.** These RAID storage systems contain multiple drives that work as a single unit; they're an excellent option for image processing or tasks that involve importing and exporting large files, but the price per megabyte is high. Jan 93

★★★★ **PowerBook 145, Apple Computer, 408/996-1010, \$2149 to \$2499.** Adequate but essentially outdated notebook computer is an upgraded version of the discontinued PowerBook 140 with a faster 25MHz 68030 CPU, but RAM expansion is limited, and it doesn't have a built-in video port. Feb 93

★★★★ **PowerBook 160, Apple Computer, 408/996-1010, \$2429 to \$3149.** A built-in video port and gray-scale capability are the new features Apple offers with this notebook computer. While it offers good processing speed and power, the passive matrix display doesn't cut it for all-day use as a primary screen. Feb 93

★★★★ **PowerBook 180, Apple Computer, 408/996-1010, \$4109 to \$4469.** An active matrix screen and a math coprocessor are the only differences between this notebook computer and the PowerBook 160, but the beautiful display is worth the extra \$1000. Feb 93

★★★★ **PowerBook Duo 210 and 230, Apple Computer, 408/996-1010, 210 (4/80) \$2249, 230 (4/80) \$2609.** Apple's smallest computers have the pleasing heft, size, and shape of hardbound books but pack the horsepower of 030 chips. Although the screen, keyboard, and trackball (more of a "trackmarble") feel small, these computers virtually cry out to be picked up, handled, and used. Mar 93

★★★★ **QuadFlextra, Quadram, 404/923-6666,**

\$495. Remarkable super-high-density floppy drive uses an ingenious disk-formatting method to put just over 20MB on a single 3½-inch floppy disk, but it may not be as cost-efficient as other options. Apr 92

★★★★ **Quantum Passport XL 240, Quantum Corp., 800/624-5545, external chassis \$469, 240MB drive \$979.** An excellent piece of engineering, this fast, trouble-free, removable hard drive is designed to solve the problem of how to transport data from one computer to another. The price is only somewhat discouraging. Oct 92

★★★★ **Radius Rocket 33, Radius, 408/434-1010, \$2499.** The accelerator board of choice for our reviewer, this 68040, 33MHz board is fast, reasonably priced, and compatible with a Mac II (with Rev. B ROM), IIx, IIcx, or IIci. Oct 92

★★★★ **TokaMac II FX 33, Fusion Data Systems, 512/338-5326, \$2995.** CPU and FPU tasks on a Mac IIcx are faster than on a Quadra 950 with this 68040 33MHz accelerator board, but video- and disk-intensive tasks are still slower. It may be worth the cost if your IIcx already has a fast video board and more than enough memory. Oct 92

VIDEO/DISPLAY

★★★★ **BookView Imperial, Computer Care, 612/371-0061, \$1399 (includes 6MB of RAM).** This notebook-display adapter supports all common sizes of monitors, including 16-inch and 19-inch, plus both Mac and VGA. It is expensive, however, and uses 2MB of system memory for video processing. Feb 93

★★★★ **Canon RC250, Canon USA, 714/753-4320, \$799.** An adequate choice for users looking for an inexpensive still-video system. Camera captures up to 50 color images per video floppy disk and hooks up to any television. Jun 92

★★ **Dycam Model 1, Dycam, 818/998-8008, \$895.** Compact, point-and-shoot, still-video camera records and downloads images in 8-bit gray-scale—as long as the battery doesn't die first. Jun 92

★★★★ **Macintosh 16" Color Display, Apple Computer, 408/996-1010, \$1599.** The display quality of Apple's 16-inch monitor is tough to beat. It has realistic color, minimal curvature, and a uniform display. Jun 92

★★★★ **Power Portrait, Sigma Designs, 510/770-0100, \$899 or \$949.** Hook your Classic or PowerBook to this 15-inch portrait-style monochrome display. Built-in QuickDraw acceleration speeds up the slow SCSI connection on the one hand and results in a few software incompatibilities on the other. Feb 93

★★★★ **PowerVision, Mirror Technologies, 612/633-4450, with no RAM \$499, with 2MB of RAM \$699, with 4MB of RAM \$999.** Separate VRAM means you don't lose system memory with this nicely priced notebook display adapter. It only supports 12-inch and 14-inch monitors, and 15-inch portrait gray-scale and black-and-white monitors. Feb 93

★★★★ **VideoSpigot, SuperMac Technology, 408/245-2202, \$499 to \$1599.** Grab video from a camcorder, video deck, TV, or monitor with this easy-to-install board and save it as a 24-bit QuickTime movie. Comes with ScreenPlay, an application that lets you choose from among several compression options, frame rates, and window sizes. May 92 **m**

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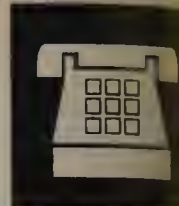
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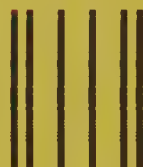
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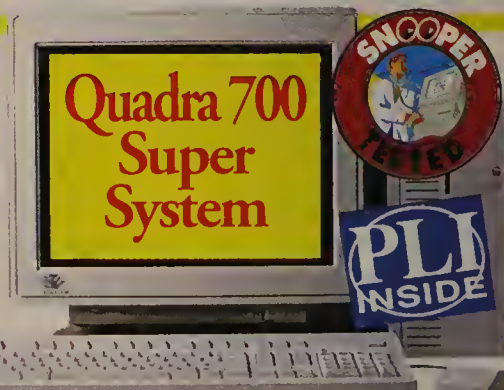
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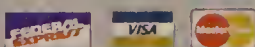
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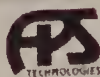
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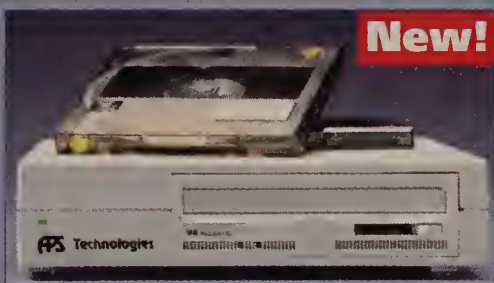
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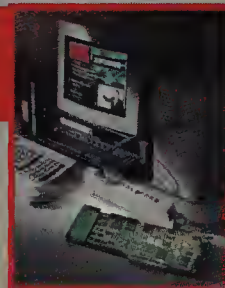
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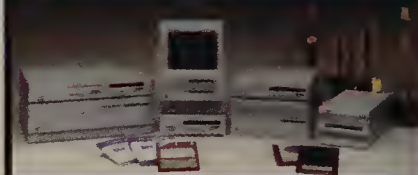
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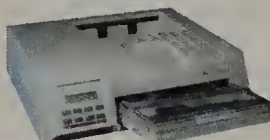
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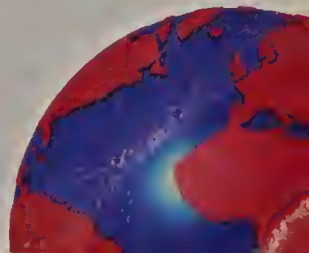
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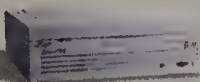
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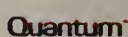
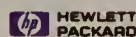
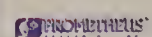
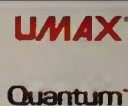
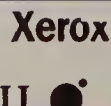
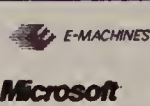
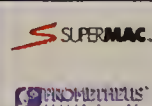
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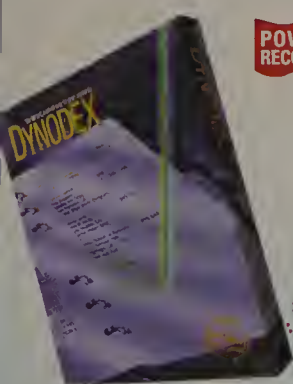
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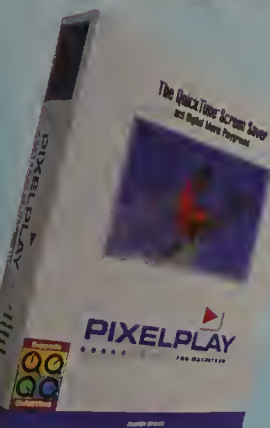
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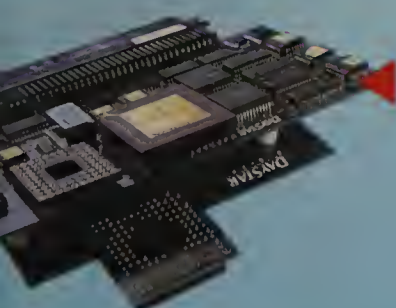
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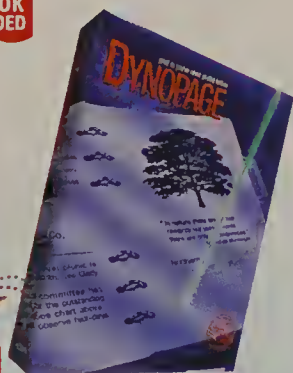
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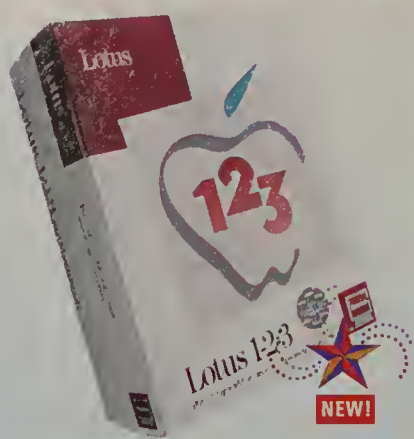


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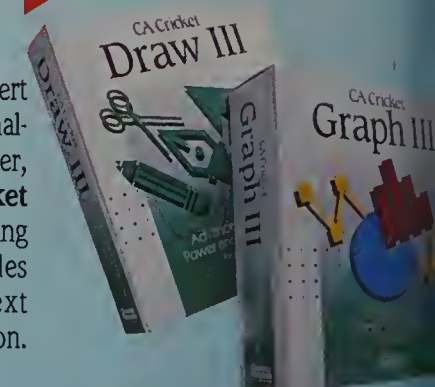
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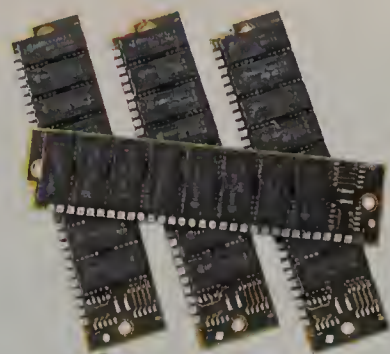
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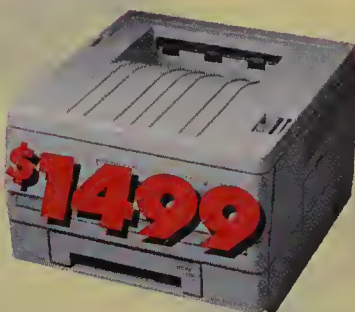
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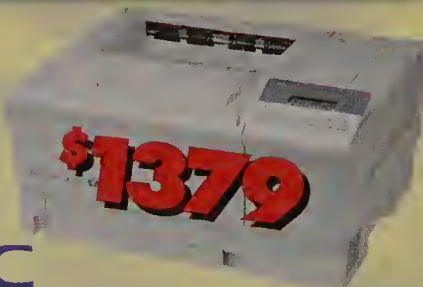
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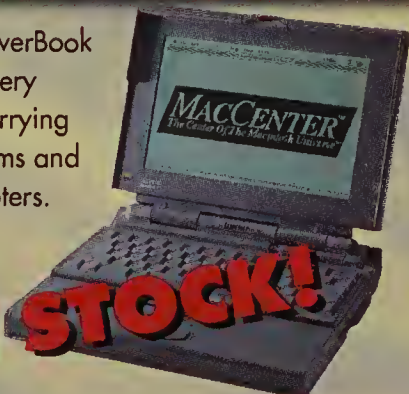
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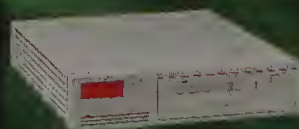
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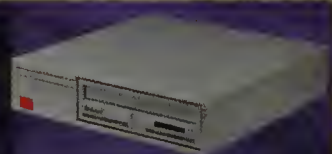
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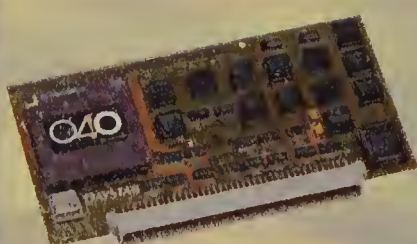
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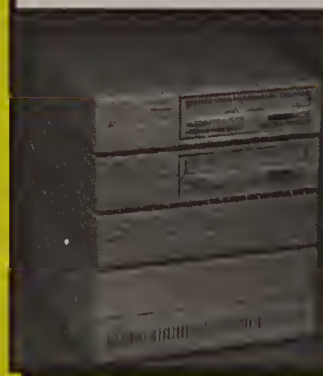
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MultiSync 5FG - 17" Monitor	\$1315
MultiSync 6FG - 21" Monitor	\$2399
FG8x 8-bit board	\$655
FG24x 24-bit board	\$1255
FG24xp 24-bit board	\$499
CD-ROM CDR-37	\$425
CD-ROM CDR-74	\$625
SilentWriter 95F Printer	\$1385
SilentWriter 95FX Printer	\$1865
SilentWriter 97F Printer	\$1755
SilentWriter 97FX Printer	\$2199
ColorMate PS-40 Color Printer	\$4399

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Quadra 700/950 4x8/16x8	\$115/\$495
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Duo 210/230 4mb/8mb	\$219/\$439
PC 1x9/4x9 @ 80ns	\$39/\$139

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Model	External
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2.0gb	\$1195
90m / 60m Tape	\$25/\$19

TEAC

Model	External
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150mb Tape Backup Drive	\$489
600mb / 150mb Tape	\$29 / \$19

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OPTICAL DRIVES

TEAC

Model	Speed	Size	External
128mb	45ms	3.5"HH	\$999

RICOH

Model	Speed	Size	External
650mb	28ms	5.25"FH	\$2395
128mb	45ms	3.5"HH	\$1145

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Insite



Model	External
21mb Floptical	\$295
3M Cartridge	\$25

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256REM

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GCC WriteMove II (portable)	Call

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Competition Seeing Red!

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Macs

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IIvx Color System Mac IIvx, 4MB
RAM/80HD,
14" Trinitron
Color Display,
Apple Keyboard,
Mouse, System 7
& Hypercard

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SE/30 color

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Xeba 14400 fax/receive w/ V.42bis	299

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MONITOR RES.	1152 x 876	1024 x 768
VIDEO SUPPORT	OVER 57 DISPLAYS	4 DISPLAYS
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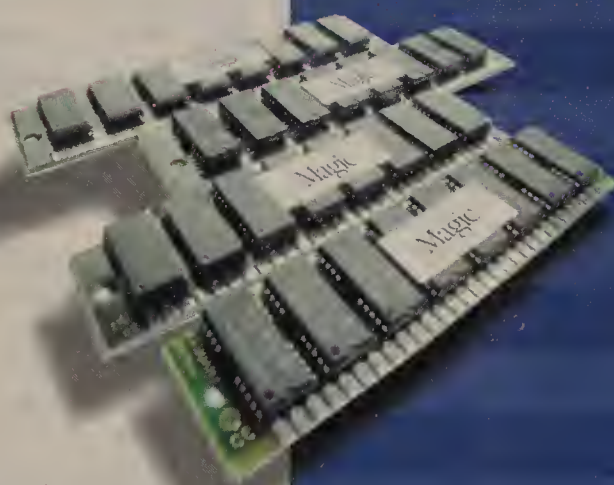
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ClubMac 88c Internal	\$599
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* ClubMac 88c will read and write 44mb cartridges, but will not format 44mb cartridges.

CLUBMAC 44MB REMOVABLES

ClubMac 44mb External (SQ555)	\$389
ClubMac 44mb Internal	\$369
ClubMac 44mb Dual	\$729

CLUBMAC 88MB REMOVABLES

ClubMac 88mb External (SQ5110)	\$489
ClubMac 88mb Internal	\$469
ClubMac 88mb Dual	\$899

SYQUEST REMOVABLE CARTRIDGES

44mb Cartridge	\$63
88mb Cartridge	\$97

Quantum



Unformatted Capacity	Model	Average Access	Actual MAC Capacity	Internal	External
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120mb	GO•120	17ms	120mb	\$455	\$555
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42mb	ELS42	19ms	40mb	\$185	\$245
85mb	ELS85	17ms	82mb	\$235	\$295
127mb	ELS127	17ms	124mb	\$305	\$365
170mb	ELS170	17ms	160mb	\$345	\$405

LPS SERIES (3.5" LOW PROFILE)

240mb	LPS240	10ms	234mb	\$515	\$575
525mb	LPS525	10ms	525mb	\$1045	\$1105

PRODRIVE SERIES (3.5" HALF HEIGHT)

425mb	PRO425	19ms	406mb	\$899	\$959
700mb	PRO700	10ms	700mb	\$1245	\$1305
1.0GIG	PRO1050	10ms	1.0GIG	\$1525	\$1585
1.2GIG	PRO1225	10ms	1.2GIG	\$1695	\$1755

ELS, LPS, PRO drives carry a TWO Year Warranty. Go•Drives carry a ONE Year Warranty.

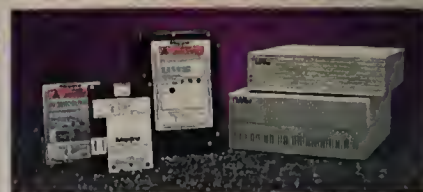
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Unformatted Capacity	Model	Description	Average Access	Actual MAC Capacity	Internal	External
425mb	M2623SA	3.5" Half Height	9ms	405mb	\$899	\$959
520mb	M2624SA	3.5" Half Height	9ms	496mb	\$989	\$1049
1.2GIG	M2266	5.25" Full Height	14.5ms	1029mb	\$1529	\$1629
2.0GIG	M2652	5.25" Full Height	14.5ms	1.6GIG	\$2495	\$2595

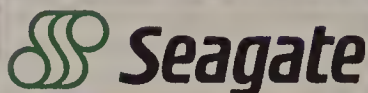


PANTHER SERIES



Unformatted Capacity	Model	Description	Average Access	Actual MAC Capacity	Internal	External
XT SERIES (3.5" Low Profile)						
120mb	7120XT	3.5" Low Profile	15ms	121mb	\$269	\$329
207mb	7213	3.5" Low Profile	15ms	202mb	\$389	\$449
LXT SERIES (3.5" HALF HEIGHT)						
330mb	LXT-340	3.5" Half Height	15ms	324mb	\$639	\$699
535mb	LXT-535	3.5" Low Profile	12ms	510mb	\$975	\$1035
XT-8000 AND PANTHER SERIES (5.2" FULL HEIGHT)						
645mb	XT-8760S	5.25" Full Height	16.5ms	639mb	\$1179	\$1279
1.2GIG	PO-12S	5.25" Full Height	13ms	997mb	\$1429	\$1529
1.7GIG	PO-17S	5.25" Full Height	13ms	1433mb	\$1729	\$1829

Maxtor 3.5" Drives carry a ONE Year Warranty. Maxtor 5.25" Drives carry a TWO Year Warranty.



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Unformatted Capacity	Model	Description	Average Access	Actual MAC Capacity	Internal	External
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2.1GIG	ST42100N	5.25" Full Ht Wren-9	12.9ms	1900mb	\$2099	\$2199
1.6GIG	ST41600N	5.25" Full Ht Elite-1	11.5ms	1307mb	\$2029	\$2129
2.4GIG	S142400N	5.25" Full Ht Elite-2	11ms	2050mb	\$2919	\$3019
3.4GIG	ST43400N	5.25" Full Ht Elite-3	11ms	2750mb	\$3929	\$4029

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Unformatted Capacity	Model	Description	Average Access	Actual MAC Capacity	Internal	External
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170mb	CP30170E	3.5" Low Profile	9ms	160 mb	\$315	\$375
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2.0GIG	WangDAT 1300XL	DAT, DDS	4mm	\$1249	\$1269
3-5GIG	WangDAT 3200	DAT, DDS-DC	4mm		\$1489
2.0GIG	HP 35470A	DAT, DDS	4mm	\$1329	\$1349
3-5GIG	HP 35480A	DAT, DDS-DC	4mm	\$1529	\$1549
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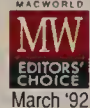
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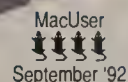
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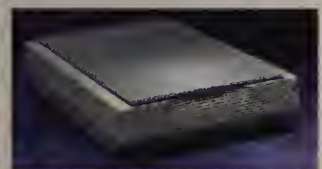
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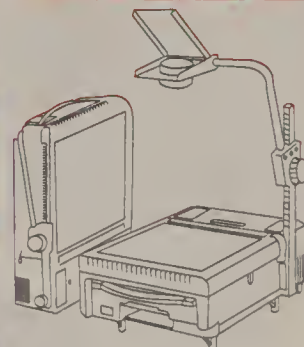
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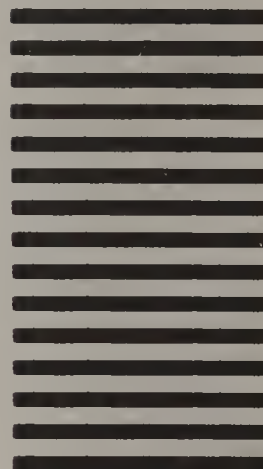
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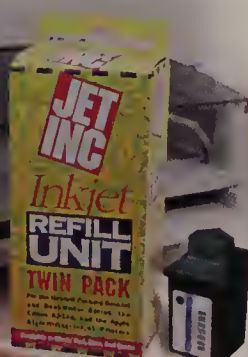


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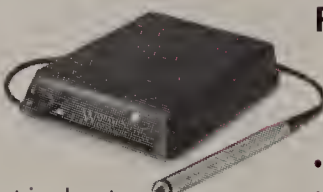
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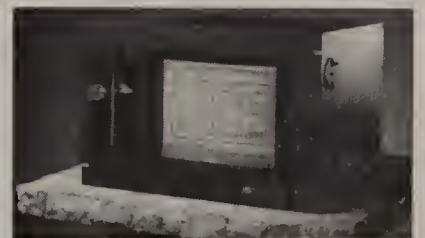
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The Macintosh Herald

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The Incredible Shrinking Macintosh

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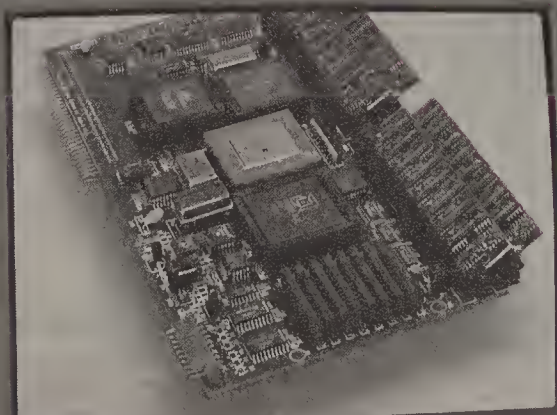
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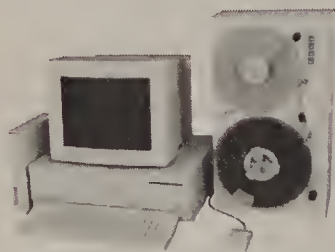
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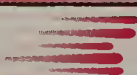
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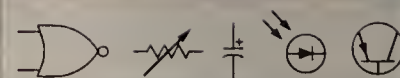
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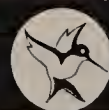
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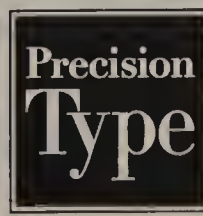
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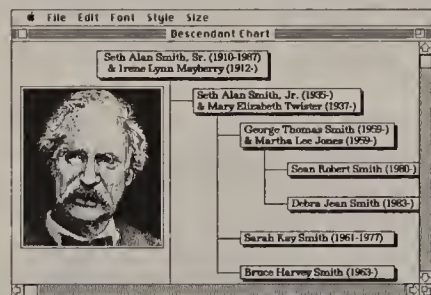
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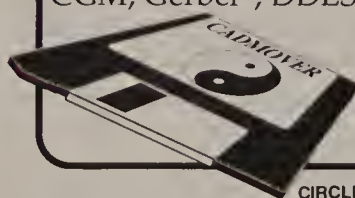
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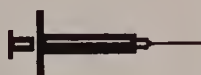
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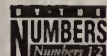
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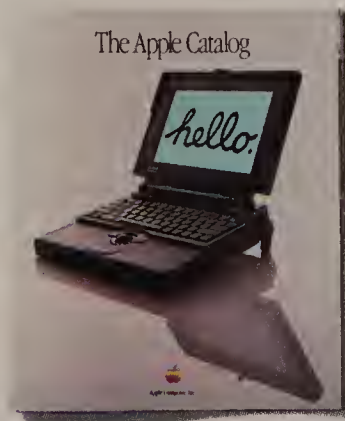
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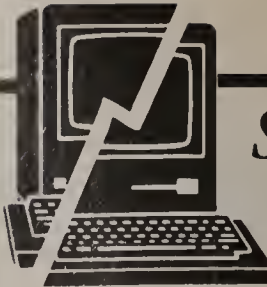
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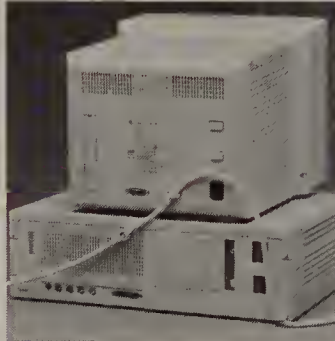
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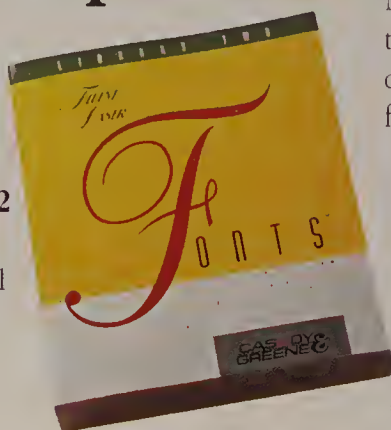
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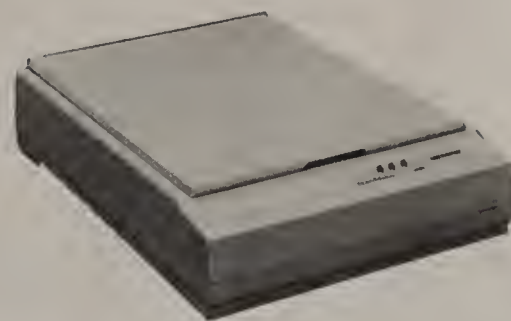
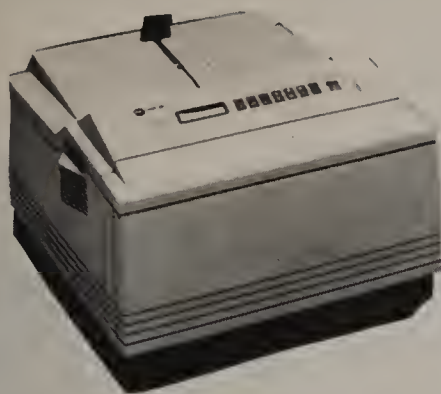
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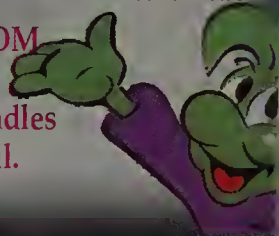
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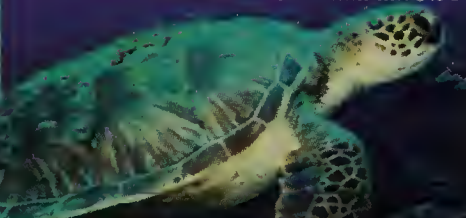
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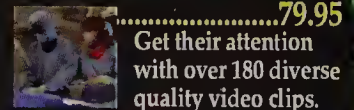
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1653 Wraptures One Over 120 textures.\$95

Published by Form & Function

2078 Animal Alphabet \$59.95

Colorfully animated, this engaging program is designed to help young children learn letters and words. Each letter is represented by an animal. Select an animation, QuickTime video, or narrated sentence based on the chosen letter.

Published by REMedia

1924 ABC Songbook...\$29.95

Entertaining from A to Z as you hear a story related to each letter of the alphabet. Rockin' tunes and funny stories.

Published by Gazelle Technologies, Inc.

Background created w/Wraptures One—#1653, \$95



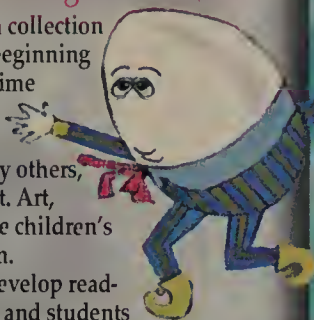
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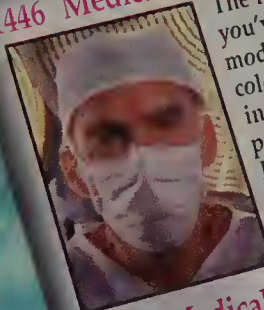
2062 Children's Treasury of Stories, Nursery Rhymes, and Songs\$39.95

This wonderful multimedia collection will fascinate and educate beginning readers. You'll find the all-time favorites here, like Jack and Jill, Humpty-Dumpty, The Three Little Bears, and many others, in a lively interactive format. Art, music, and narration capture children's attention and entertain them. Accompanying questions develop reading skills. Parents, teachers, and students can create and print out their own stories.

Published by Queue



1446 Medical Photo Library-MR.....\$79.95



The incredible medical library you've been waiting for! 200 model-released, royalty-free 24-bit color images of surgery, surgical instruments, emergency room, patients, hospital personnel, X-Ray, rehabilitation, examination, critical care, medical research, newborns, and mammography. Medium resolution.

1447 Medical Photo Library-HR\$169.95

Same images as MR version, but in medium & high resolution, 18 meg files. 3-CD set. Kodak Photo CD Format. Published by Gazelle Technologies, Inc.

2068 The Journeyman Project \$79.95
The world's first photorealistic adventure game. It blew away the competition at the MacWorld Expo - "Forget about the director's cut of Blade Runner!...This time-travel adventure with stunning rendered graphics, sets the current standard for new...CD owners." MacUser Magazine - A rip has been detected in the fabric of time. Only moments remain until the continuum is changed forever. Your objective: jump back in time and prevent the corruption from ever happening!

Published by Presto Studios



1445 Fetch\$195.00

A powerful multiuser, mixed-media cataloging, browsing, and retrieval tool on diskette. Bundled with A Thousand Fonts CD-ROM-limited time offer.

Published by Aldus Corporation

1786 Boris Vallejo\$99.95

200 incredible fantasy art pictures in 24-bit color.

1787 La Femme Venus\$99.95

Featuring samples from The International Salon of Photographic Art 'Venus Studies And Portraits'.



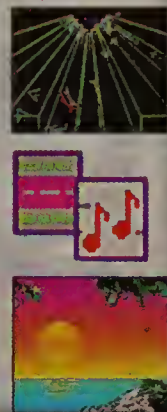
1327 ExoticaROM 3.0.\$99.95

Olivia is one of the foremost artists of our time. Here's 200 extraordinary exotic pieces, a color browser, and a QuickTime interview with Olivia.



Published by Gazelle Technologies, Inc.

1300 EDUCORP Shareware 7.0 2-CD Set.....\$199.00
From artists to zoologists, there's something for everyone! This 2-disc set is loaded with the best public domain & Shareware software available. Over 1 gigabyte. You'll find education, business, graphics, desk accessories, utilities, sounds, games and much more! You'll also get an easy-to-use HyperCard Browser. \$50 off with CD-ROM drive purchase from EDUCORP.



Published by EDUCORP

2069 QuickLaffs v.1\$79.95

See classic movies in QuickTime starring Charlie Chaplin and The Keystone Cops.

Published by Gazelle Technologies, Inc.

2089 Lunicus.....\$79.95

The moonbase Lunicus Station is the Earth's last hope against a mechanized hoard of alien invaders! Fight the enemy through the great cities of Earth. If you survive, then it's back to Lunicus to defend the moonbase. When the station is secure, it's time to confront the evil Hive Queen herself... aboard the mothership! Original soundtrack, talking Cyber Puppets, virtual reality environments!



Published by CDSOFT

2067 A Thousand Fonts \$39.95

A huge collection of TrueType, Type 1, Type 3, and Screen fonts.

Published by EDUCORP



1334 Prof. Photo. Collection-MR.\$59.95

100 model-released, royalty-free photos of people, places, and things in 24-bit color. Medium resolution.

1444 Prof. Photo. Collection-HR...\$99.95

Same images as MR version, but in high resolution, 18 meg files. 2-CD set. Kodak Photo CD Format.



Published by Gazelle Technologies, Inc.



1442 The Animals! ..\$79.95

The San Diego Zoo presents this true multimedia experience. See and hear over 200 exotic mammals, birds, and reptiles in over 60 minutes of award-winning video clips. Learn about each animal from experts, listen to narrated stories,

or visit over 300 animal and habitat exhibits. You also get access to all of the media.

1047 US. Atlas.....\$39.95

High quality color and b/w detailed reference and relief maps, flags, anthems and more for all 50 states.

Published by Software Toolworks

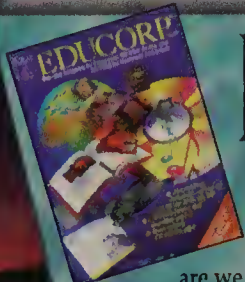


1697 Sky v.1 version 2.0 PrePress\$99.95

The reviews are in and the skies have it! Enhance multimedia productions, create ads, special effect backgrounds and more with one of the best sellers of '92. Call up any one of 100, 2,000 DPI drum-scanned, high resolution photo images in minutes. The new interface allows you to view all the images quickly, zoom in, and save the file as 8/24-bit, or 15MB JPEG's. Cloud

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Best-Sellers

APRIL 1993

Months on chart
▼ Last month
▼ This month

Business Software

86	1	1	Microsoft Excel <i>Microsoft Corporation</i>
17	2	2	Microsoft Office <i>Microsoft Corporation</i>
95	3	3	Microsoft Word <i>Microsoft Corporation</i>
47	4	4	FileMaker Pro <i>Claris Corporation</i>
16	5	5	MacDraw Pro <i>Claris Corporation</i>
33	8	6	Quicken <i>Intuit</i>
9	7	7	ClarisWorks <i>Claris Corporation</i>
72	6	8	Microsoft Works <i>Microsoft Corporation</i>
10	12	9	1-2-3 for the Macintosh <i>Lotus Development</i>
47	9	10	WordPerfect for the Macintosh <i>WordPerfect Corporation</i>
70	11	11	MacDraw II <i>Claris Corporation</i>
35	13	12	QuarkXPress <i>Quark</i>
25	15	13	MacProject <i>Claris Corporation</i>
82	14	14	Aldus PageMaker <i>Aldus Corporation</i>
1	—	15	GreatWorks <i>Symantec</i>

Education Software

18	1	1	Math Rabbit <i>The Learning Company</i>
1	—	2	Math Blaster Plus <i>Davidson & Associates</i>
61	3	3	Reader Rabbit <i>The Learning Company</i>
2	—	4	The Oregon Trail <i>MECC</i>
3	2	5	The Writing Center <i>The Learning Company</i>

Months on chart
▼ Last month
▼ This month

Entertainment Software

60	1	1	Microsoft Flight Simulator <i>Microsoft Corporation</i>
6	3	2	Kings Quest IV <i>Sierra On-Line</i>
34	4	3	Tetris <i>Spectrum HoloByte</i>
33	—	4	Falcon <i>Spectrum HoloByte</i>
20	—	5	Beyond Dark Castle <i>Aldus Consumer Division</i>

Network/Data Communications

10	2	1	AppleTalk Remote Access <i>Apple Computer</i>
41	1	2	PhoneNet <i>Farallon Computing</i>
64	4	3	AppleShare <i>Apple Computer</i>
18	—	4	Netware for Macintosh <i>Novell</i>
22	5	5	White Knight <i>FreeSoft</i>

Add-In Boards

24	1	1	Macintosh IIx NuBus Adapter Card <i>Apple Computer</i>
28	3	2	Macintosh Display Card 8•24 <i>Apple Computer</i>
8	2	3	Macintosh II FDHD Upgrade <i>Apple Computer</i>
20	—	4	Radius TPD Interface <i>Radius</i>
2	4	5	MacCon3 for NuBus <i>Asanté</i>

Months on chart
▼ Last month
▼ This month

Utility Software

23	1	1	After Dark <i>Berkeley Systems</i>
34	2	2	SAM <i>Symantec Corporation</i>
29	3	3	Norton Utilities for Macintosh <i>Symantec</i>
13	4	4	More After Dark <i>Berkeley Systems</i>
23	5	5	Virex <i>Microcom</i>

The AmCoEx Index of Used Mac Prices

Machine/RAM/ Hard Drive	Average Sale Price	Monthly Change
Mac SE/2MB/20MB	\$675	-\$25
Mac Portable/1MB/40MB	\$650	+\$50
PowerBook 100/4MB/40MB	\$900	+\$100
PowerBook 140/4MB/40MB	\$1400	+\$50
Mac Classic/2MB/40MB	\$675	+\$50
Mac SE/30/2MB/40MB	\$1450	\$0
Mac LC/2MB/40MB	\$850	+\$25
Mac II/4MB/40MB	\$1300	\$0
Mac IIsi/3MB/40MB	\$1225	+\$50
Mac IIcx/4MB/80MB	\$1400	-\$100
Mac IICI/4MB/80MB	\$1950	+\$100
Mac IIfx/4MB/80MB	\$2600	-\$100
Apple 12-inch B&W display/board	\$125	\$0
Apple 13-inch RGB display/board	\$400	-\$25
LaserWriter Plus	\$825	+\$25
LaserWriter IINT	\$1175	+\$25

Index provided by the American Computer Exchange of Atlanta, Georgia (800/786-0717). It reflects sales during week of December 21. Configurations include keyboard and exclude monitor and display board for noncompact models.

Source: Exclusive Audits & Surveys research from more than 250 Macintosh retailers and selected mail-order vendors. Covers sales during December 1992.



Announcing a better mousetrap.

NEC

The NEC MultiSync® 4FG™. The ultimate monitor for your Macintosh®.



At NEC, we've developed hundreds of computer products expressly for Mac systems: from our highly-acclaimed MultiSync monitors, MultiSpin™ CD-ROM readers and Silentwriter® laser printers, to our Professional Graphics Series, which includes our new 27" MultiSync 3PG data monitor and MultiSync 6PG and 9PG Projection Monitors for images as large as 25 feet.



*—MacUser Magazine
Aug. '92*

The least you should do for your Mac®.

The NEC MultiSync® 3FGx™ monitor.



In 1992, the only monitor to snag the coveted five-mice rating was an NEC monitor: the remarkable MultiSync 4FG. After running it and 13 others through the most rigorous technical evaluation they'd ever used for testing monitors, *MacUser* magazine concluded, "If you're looking for the sharpest display, the NEC MultiSync 4FG should be your top choice."

What more can we say? Glad you asked. First, there's our AccuColor™ Control System, which prompted *MacUser* to make special mention of the "easy color adjustments." AccuColor lets you adjust on-screen colors, so if you're looking for mouse-tail pink, that's what you'll get.

If, however, color control is not a priority for you, you'll be very happy with NEC's MultiSync 3FGx monitor, which shares almost all of the 4FG's award-winning features. Both monitors produce sharp, bright images, crisp graphics and vibrant colors. An Invar shadow mask provides increased brightness without loss of focus. And our high-contrast polished screen improves clarity.

Another big idea—the display area. The large 15" screen* coupled with FullScan™ capability for edge-to-edge images gives you a considerably larger display area than typical 13" or 14" RGB monitors.

How do you make an NEC MultiSync monitor work with your Mac? Just plug it in, using

NEC's free FG/Mac cable adapter. It works with the Mac's on-board video, so you won't need an add-in video board.†

Both monitors are compatible with the Mac® II family, Quadra™ series, LC's, PowerBooks™ and PC systems. So you can use just one monitor for both types of platforms. *MacUser* noted the "powerful and versatile controls make switching from a Mac to a PC a snap."

And to make these monitors as user-friendly as possible, we've included ergonomic features such as a tilt/swivel base and up-front user controls. Plus, our Reduced Magnetic Field™ technology meets the strict Swedish MPR II guidelines for magnetic field emissions.

There are lots of reasons for considering an NEC MultiSync monitor for your Mac—the sharp, bright images, the vibrant colors, the large display area, the flexibility, the compatibility—to name five. And the 🖱️🖱️🖱️🖱️🖱️ to name five more.

For more information on our award-winning monitors, call 1-800-NEC-INFO (in Canada: 1-800-343-4418). Or for information via fax, call NEC FastFacts™ at 1-800-366-0476, request #62234.

†For Macintosh 640 x 480 resolution, just attach NEC's FG/Mac cable adapter and plug into: Macintosh IIfx, IIfx, LC, LCII, IIfx, IIfx, Quadra™ 700, Quadra 900, Quadra 950, Performa™ 400, Performa 600, PowerBook™ 160, PowerBook 180, and the PowerBook 210 and PowerBook 230 with either the DuoDock™ or MiniDock™. Or with an add-in video card: Macintosh II, IIfx, IIfx, PowerBook 140, PowerBook 145, and PowerBook 170. Get the FG/Mac adapter free by calling NEC at (312) 622-7427 8:30AM-5PM CST.

*15" CRT yields 13.8" active display area. All quotes reprinted from *MacUser* magazine, August 1992. © 1992, Zif Communications Company. MacUser and Smice logo are registered trademarks of Zif Communications Company. MultiSync is a registered trademark and AccuColor, FastFacts, FG, FullScan, Reduced Magnetic Field and MultiScan are trademarks of NEC Technologies, Inc. Silentwriter is a registered trademark of NEC Corporation. All other trademarks are the property of their respective owners. © 1992 NEC Technologies, Inc.

Because ↑ is the way you want to go. **NEC**

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Cursor control. After all, that's what a pointing device really is all about. And now, with the introduction of Turbo Mouse® 4.0, cursor control takes on a whole new meaning.

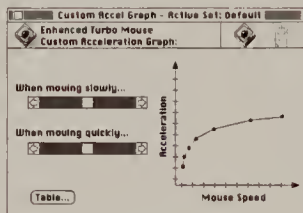
Macworld said, "Turbo Mouse 4.0 represents a real breakthrough in trackball software design. If you're shopping for a trackball, Turbo Mouse deserves first consideration."

Why a breakthrough?

Why is Turbo Mouse rated number 1?

The answer lies in a new and total integration of hardware and software. Take a look:

Custom Acceleration lets you change cursor speed according to the way you move the trackball. The faster the movement, the faster the acceleration. You



can even have negative acceleration for detailed and precise work.

Want a really slow cursor? Activate the Slow Cursor command and you can temporarily move your cursor one pixel at a time.

Want a really fast cursor? Our new Brilliant Cursor™ technology will jump your cursor from one programmed HotSpot

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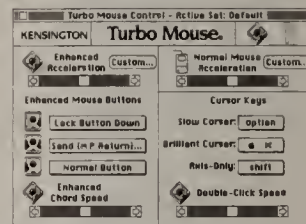
Don't just control your cursor.



to another. A real plus for large screen and multiple monitor setups.

And Turbo Mouse 4.0 features Enhanced Mouse Buttons that let you execute one of seven useful commands. You can even have the same button perform different commands in different applications.

Combine all this with onscreen help, System 7 compatibility, two ADB ports for chaining — not to mention a large comfortable ball with an ultra-responsive feel — and



you'll understand why Turbo Mouse has won more awards than any other Macintosh input device in history.

For more information, call 800-535-4242.

For information by fax, press 82 and request document 320. Outside the US and Canada, call 415-572-2700.



Dominate it.